

The 100 Watt 20kHz Ultrasonic Process System

EQUIPMENT SPECIFICATION



Model: P100/6-20

Sonic Systems Limited

1.0 GENERAL

This high intensity ultrasonic processing system has been specifically designed for research and production work in the treatment of liquids, gases and solids by ultrasound. It offers the advantage that acoustic as well as electrical parameters may be monitored thereby giving the user full process information.

The systems operate at a nominal frequency of 20kHz.

The system has a "power by demand" characteristic. That is to say when the required operational transducer amplitude has been selected then the power transmitted will depend on the acoustic parameters of that load. The vibrational amplitude will be held at the pre-set level regardless of the load when the system is used within its rated characteristics.

Acoustic energy is coupled to the treatment sample by means of resonant horns and can be controlled by adjusting the transducer amplitude.

Vibrational amplitude (displacement) and power to the transducer are all continuously monitored and a RS232 interface is provided to enable remote operation.

A true motional feedback network maintains transducer resonance and the transducer motion is displayed on the front panel meter. The front panel display may be switched to read either transducer displacement (Microns peak to peak), or electrical power delivered to the transducer (Watts). It is also possible to measure Acoustic Power with this system.

The electronic system is housed in a bench standing case, the transducer in a sealed housing. These are high efficiency devices and have been designed for continuous operation without forced air-cooling.

2.0 CONTROLS

2.1. Mains On/Off

By means of a single-pole rocker switch located on the rear panel.

2.2. Amplitude/Power output

By means of membrane switches on the front panel and designated "AMPLITUDE"

2.3. Sonics On/Off

Membrane Switch Marked "SONICS"

2.4. Meter Display

Membrane Switch Marked "DISPLAY"
Amplitude/Watts

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2.5. Mode Select

Toggles between “Local” or “Remote” control

3.0 REMOTE OPERATION

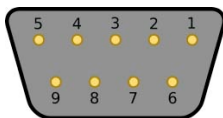
3.1. RS232 Interface

A 9-Way D socket is provided on the rear panel to enable communication between a PC and the P100-20. With the RS232 interface it is possible to remotely operate the P100-20. 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

Note: This indicator flashes in the event of an 'out of frequency' condition.

5.2. Green LED

Sonics On

6.0 MONITORS

6.1. Amplitude

Digital meter calibrated in microns peak-peak measuring transducer displacement

Meter Range: - 0 - 16 Microns

6.2. Power

Digital meter measuring Sonic electrical power to the transducer in Watts.

Meter Range: - 0 - 120 Watts

7.0 ACOUSTIC SYSTEM

7.1. Transducer

These are a high efficiency pre-stressed piezoelectric design. The main body of the transducer is constructed from aluminium alloy. This is mounted in a sealed housing and is designed for continuous operation.

7.2. Frequency

Model 23820A

20kHz

7.3. Transducer Displacement

The maximum vibrational amplitude at the transducer radiating face is 16 microns Pk-Pk

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

Some knowledge of resonant horn design and the acoustic parameters of the load are required for a successful operation of the equipment.

Please refer to our website for reference on considered design :

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

Reference to figure 5 will show the relationship between acoustic power, horn amplitude and radiating face area. It is possible to calculate the Acoustic Power using this equipment

9.0 ELECTRICAL

9.1. Mains Supply

230 volts +/-7% (selected internally)
115 volts +/- 7%

50 - 60 Hz Single Phase

9.2. Classification

Class 1. Must be earthed.

9.3. Power Consumption

150VA Maximum

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- 9.4. Mains connector** IEC socket mounted on rear panel.
Contains integral single-pole rocker switch with a 20mm fuse.
- 9.5. Fuse** 20mm Ceramic body anti-surge

2 Amp for 230V operation
4 Amp for 115V operation
- 9.6. Operational Frequency** 20kHz nominal
- 9.7. Frequency Control** Automatic. A feedback network senses the motion of the transducer/acoustic system and maintains the system at its optimum operating frequency.
- 9.8. Power Output** The generators are designed for a potential power output of 120 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 conditions of load. Power transferred to the load may be controlled by selection of Horn design.
- 9.9. Duty cycle** Capable of a continuous 24-hour operation.
- 9.10. E.M.C.** This equipment has been suppressed to meet the requirements of the European Community Directive 89/336/EEC Amended 95/54/EC
- 10.0 MECHANICAL** The electronics are mounted into a bench standing case.
- 10.1. Dimensions** Width. 363.7 mm

Depth. 376 mm

Height. 111 mm

10.2. Weight	Generator Assembly:	4.5kg
	Transducer Assembly:	352g

10.3. Colour Light Grey RAL 7035 & Stone Grey RAL 7030

11.0 DESIGN STANDARDS

11.1. Design Standards Meets the general requirements of BSEN61010

11.2. Electrical Safety Complies with EC Directive 72/23/EEC Amended 93/68/EEC
Conforms to BSEN61010 (1993)

12.0 EMC Complies with EC Directive 89/336/EEC Amended 95/54/EEC

Conforms to

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

13.0 Environmental

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| 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 |

