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User Manual
ULTRASOUND BALANCE
Model 18

Introduction

The balance consists of a tank of water in which is suspended an air-backed vane. A pointer is attached to this vane and its position can be read against a calibrated scale.

Ultrasound directed against the vane causes it to be deflected and the deflection is proportional to the power (W) in the ultrasound. The balance is designed to measure the output of treatment heads having an effective area of up to 5 cm² with an accuracy of $\pm 30\%$ above 10W.

The Ultrasound Balance is designed for intermittent use only (see Instructions for use).

Record of Amendments

ISSUE	COMMENTS	DATE
1	Telephone number changed	11/03/1992
2	Fax number changed	28/09//1994
3	Telex number deleted	20/09/1995
4	Corrections	25/05/1999
5	Note added on intermittent use	3/12/2001
6	Company name change	4/10/2006
7	Reformatted	2/05/2007
8	Images added	14/10/2020

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Construction

The balance consists of a clear plastic tank that contains water. A wire frame is suspended on nylon threads from a white plastic plate. This frame supports a hollow vane set at 45° to the vertical. A pointer is attached to the frame and its position can be read against a scale which is calibrated in WATTS. Opposite the vane a piece of rubber is fixed to the side of the tank to absorb the deflected ultrasound.

The lower plate has a hole designed to support treatment heads of approximately 1.73 ins. diameter (4.45cm), while the upper, removable plate has a hole suitable for the EMS Physio Ltd. THERASONIC treatment heads.

NB. The RTB01 is filled with polystyrene balls to prevent damage in shipping – **these must be removed before use.**



Instructions for use

The balance should be filled to the level of the upper plate with water which has been boiled and then allowed to cool to room temperature.

By boiling the water two objectives are achieved : -

- a) It is degassed. This is most important as it affects the transmission of ultrasound through water and if not done would result in inaccurate measurements. (Degassing by vacuum is also possible).
- b) The water is sterilised and can be left for a long period before the growth of algae makes it necessary to discard it.

After filling allow the balance to stand for about ten minutes.

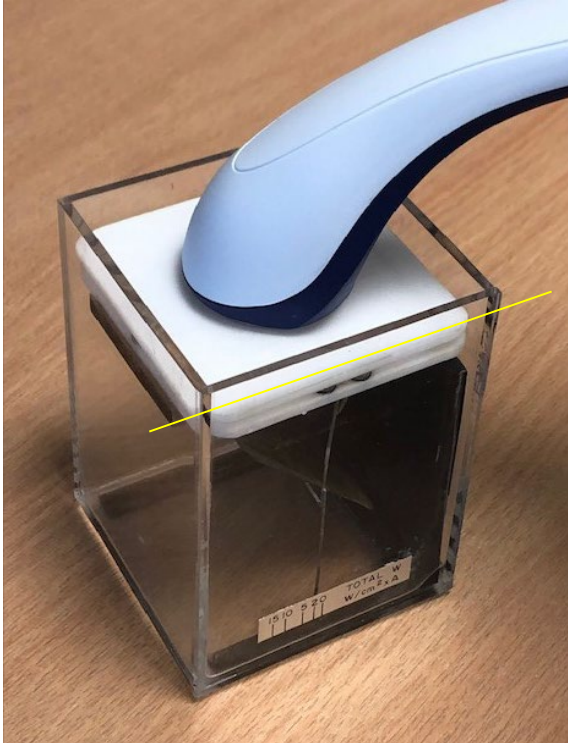
The treatment head of the ultrasonic unit should be placed over the hole of the most suitable size with the radiating surface pointing downwards. It may be necessary to support the treatment head in this position.

Switch on the ultrasonic unit and if necessary make the adjustments to the output so that there is some power being dissipated. The first irradiation will most likely cause the formation of small air bubbles on the surface of the deflecting vane and the rubber absorber. Switch off and remove these carefully with a small paintbrush before attempting any measurements.

Make sure that the balance is standing on a level surface with the pointer at zero on the scale. The output power in WATTS can be read from the scale and related to the output settings of the ultrasonic unit.

Fill balance with water to level indicated below.

The entire face of the transducer must be in contact with the water.



Calculations

To convert the total WATTS as measured on the balance to W/cm^2 the EFFECTIVE AREA of the treatment head must be known. This may be obtained from the manufacturer.

$$W/cm^2 = \frac{W_{tot}}{A_{eff}}$$

Where W_{tot} = total WATTS as measured.
 A_{eff} = EFFECTIVE AREA in cm^2

For the most accurate results the final adjustments of the output of the ultrasonic equipment should be made at the maximum indicated power of the equipment or 10W whichever is the greatest.

The Ultrasound Balance is not designed for continuous use. The ultrasound power applied to the balance should be limited to an average of 1 W / minute. Therefore, if 10 W is being measured, it should only be applied for 1 minute and not repeated for 10 minutes.

Care of your ultrasound balance

After prolonged use, it may be necessary to clean the container.

Remove the two screws indicated below and carefully extract the frame assembly – taking care not to bend or distort the delicate assembly.

Clean the inside of the container with gentle detergent and re-assemble.

