

FEATURES:

- Provides accurate calibration to within $\pm 0,3$ dB
- Calibration traceable to NBS
- Well defined sound source
- Transistorized frequency control
- High calibration level
- Individually calibrated couplers
- Easy calibration procedure
- Battery operated
- Compact and portable

USES:

- Calibration of sound measuring systems which terminate with B & K hydrophones
- Calibration of sound measuring systems which employ 1/2" microphones
- Field and laboratory use

The Calibrator for B & K Hydrophones Type 4223 is a high level, precision sound source which provides a rapid and easy method for the calibration in air of sound measuring systems which terminate with B & K hydrophones. The 4223 is compact and battery operated and is thus suitable for both field and laboratory use.

The principle of operation of the Calibrator is the same as that of a pistonphone, that is, a sound pressure is produced in the coupler cavity of the 4223 by four pistons which oscillate back and forth in phase. The frequency of the calibration tone is maintained within $\pm 2\%$ of 250 Hz by a transistor circuit

Calibrator for B & K Hydrophones



The procedure for calibrating a hydrophone, with or without a following chain of measuring instruments, is straightforward. The coupler of the requisite dimensions is selected from the three supplied with the instrument and is fitted to the 4223. The rubber housing of the hydrophone to be calibrated is smeared with glycerine to reduce friction between the housing and the coupler's sealing "O" ring. The hydrophone is then inserted into the coupler. The 4223 is switched on and the sensitivity of the hydrophone, with or without associated measuring equipment, is determined from the ratio of the voltage indicated on the measuring instrument to the sound pressure level present in the coupler.

Fig.1 shows sectional drawings of the Calibrator when fitted with the three different B & K Hydrophones by means of the various couplers. The sound pressure levels produced in the coupler volumes by the 4223 are 157 dB, 162 dB and 166 dB re $1\mu\text{Pa}$ when used with the B & K Hydrophones Types 8101, 8100 and 8104 and the 8103 respectively. These high sound pressure levels enable accurate calibrations to be made even in very noisy surroundings. The sound pressure level in the coupler volume can be monitored with a 1/2" microphone; this enables the calibration to be traceable to NBS. This facility also allows the 4223 to be used to calibrate sound measuring systems which terminate with a 1/2" microphone providing that the dummy microphone

supplied with the 4223 is placed in the coupler for the duration of the calibration procedure. A barometer supplied with the 4223 gives the atmospheric pressure correction in dB in the range 790 mbar to 1040 mbar.

The Calibrator is delivered with a set of six alkaline batteries which are mounted in a battery container. The condition of the

batteries can be checked by pushing the control switch of the 4223 to the "Batt." position whereupon the frequency of the emitted tone should be higher than in the "On" position (approximately 320 Hz with new batteries). The 4223 can operate in the temperature range -10°C to $+55^{\circ}\text{C}$ (14°F to 130°F). Providing there is no condensation, humidity does not effect the opera-

tion of the 4223.

The operating frequency of the 4223 can be varied from less than 30 Hz to 320 Hz by using an appropriate DC power supply. In this frequency range the variation of the sound pressure level with frequency is within ± 2 dB (see Instruction Manual for further details).

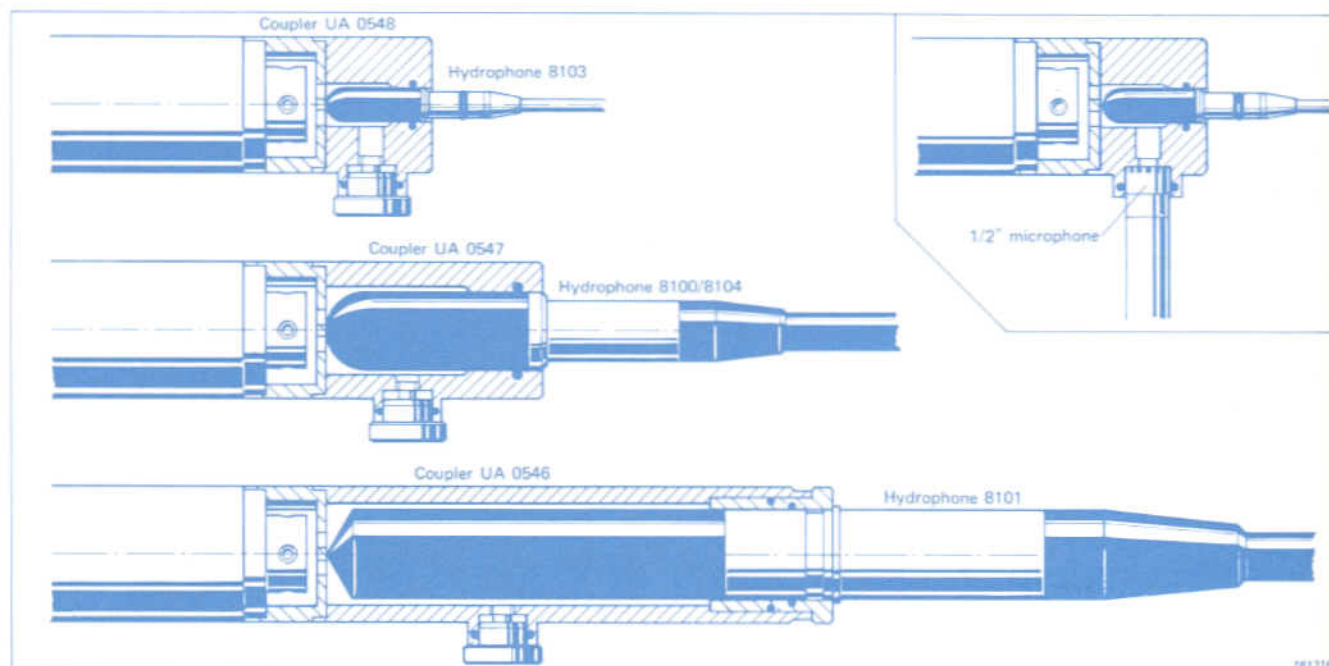


Fig.1. Mounting of B & K hydrophones and their respective couplers onto the Calibrator. The insert shows a 1/2" microphone inserted into a coupler

Specifications 4223

<p>Frequency: Pos. "On": 250 Hz $\pm 2\%$ Pos. "Batt.": Approximately 320 Hz with new batteries</p> <p>Sound Pressure Levels in Couplers: Coupler UA 0546: 157 dB re $1 \mu\text{Pa}$ for 8101 of 24 mm (0,83 in) diam. Coupler UA 0546: 154 dB re $1 \mu\text{Pa}$ for 8101 of 21 mm (0,945 in) diam. (earlier type) Coupler UA 0547: 162 dB re $1 \mu\text{Pa}$ Coupler UA 0548: 166 dB re $1 \mu\text{Pa}$ Coupler UA 0548 with 1/2" micro.: 166 dB re $1 \mu\text{Pa}$</p> <p>Accuracy: $\pm 0,3$ dB (relative to nominal hydrophone volumes)</p> <p>Distortion: < 3% at 250 Hz</p> <p>Temperature Range: Using an external power supply: -10°C to $+55^{\circ}\text{C}$ ($+14^{\circ}\text{F}$ to $+130^{\circ}\text{F}$)</p>	<p>Using batteries: -10°C to $+55^{\circ}\text{C}$ ($+14^{\circ}\text{F}$ to $+130^{\circ}\text{F}$)</p> <p>Humidity: Does not influence calibration providing condensation does not occur</p> <p>Batteries: 6 alkaline batteries IEC LR6 (QB 0013) giving approximately 24 hours continuous operation or 6 dry cell batteries IEC R6 giving approximately 8 hours continuous operation</p> <p>Dimensions:</p> <table border="1"> <thead> <tr> <th></th> <th>Length mm/in</th> <th>Diameter mm/in</th> </tr> </thead> <tbody> <tr> <td>4223 without coupler</td> <td>205 (8,07)</td> <td>36 (1,4)</td> </tr> <tr> <td>Coupler UA 0546</td> <td>137 (5,4)</td> <td>36 (1,4)</td> </tr> <tr> <td>Coupler UA 0547</td> <td>61 (2,4)</td> <td>36 (1,4)</td> </tr> <tr> <td>Coupler UA 0548</td> <td>31 (1,2)</td> <td>36 (1,4)</td> </tr> </tbody> </table>		Length mm/in	Diameter mm/in	4223 without coupler	205 (8,07)	36 (1,4)	Coupler UA 0546	137 (5,4)	36 (1,4)	Coupler UA 0547	61 (2,4)	36 (1,4)	Coupler UA 0548	31 (1,2)	36 (1,4)	<p>Weight: 4223 with batteries but without coupler 0,7 kg (1,5 lb) Coupler UA 0546 0,5 kg (1,10 lb) Coupler UA 0547 0,3 kg (0,66 lb) Coupler UA 0548 0,25 kg (0,55 lb) Total weight of case containing 4223 with couplers and barometer 2,5 kg (5,5 lb)</p> <p>Accessories included: 6 alkaline batteries, IEC LR 6, size AA, QB 0013 1 Battery Container DH 0236 1 Coupler UA 0547 for Hydrophone 8100, 8104 1 Coupler UA 0546 for Hydrophone 8101 1 Coupler UA 0548 for Hydrophone 8103 1 Barometer UZ 0003 1 Bottle of glycerine UA 0552 1 Dummy Hydrophone DO 0077</p>
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