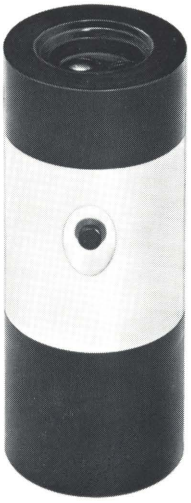
4230

INSTRUCTIONS AND APPLICATIONS

Portable Acoustic Calibrator



A simple to use pocket size acoustic calibrator. Gives accurate sound pressure level of 94 dB at 1000 Hz.

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Sound Level Calibrator

Type 4230

A portable, lightweight acoustic calibrator for accurate field calibration of sound level meters and microphone systems. Sound level 94 dB, independent of static pressure and microphone volume. 1000 Hz frequency gives independence of weighting networks.

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1. Purpose

Type 4230 is a portable lightweight acoustic calibrator for accurate field calibration of sound level meters and other sound measuring systems. It fits all B & K sound level meters and microphones of 1 in and 1/2 in diameter. A unique construction gives a high equivalent volume of the calibrator, and the sound pressure developed is, therefore, independent of microphone volume. This means that exact fitting of the microphone in the coupler is not critical, and that different microphones can be compared without correction for equivalent volume.

The calibrator is virtually unaffected by variations in static pressure and works accurately within a wide temperature range.

The sound pressure level developed is 94 dB re 2×10^{-5} N/m^2 (1 N/m^2) and the accuracy of calibration is better than ± 0.3 dB. A frequency of 1000 Hz has been chosen, to give independence of the weighting networks A, B, C and D used with many sound level meters. These have a common reference at 1000 Hz.

The operation of the calibrator is extremely easy: just fit the microphone into the cavity, press the button on the calibrator and adjust your meter to correct reading.

2. Operation

The calibrator is made for calibration of 1 in and 1/2 in diameter microphones. An adaptor is placed in the front opening for use with 1/2 in microphones, and this adaptor is removed when 1 in microphones are calibrated. (Fig.2.1)

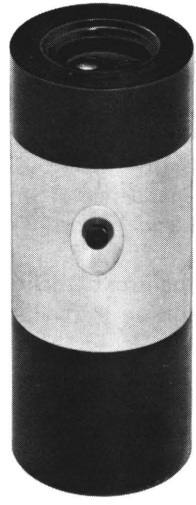


Fig. 2.1. Calibrator with Adaptor for 1/2" Microphone.

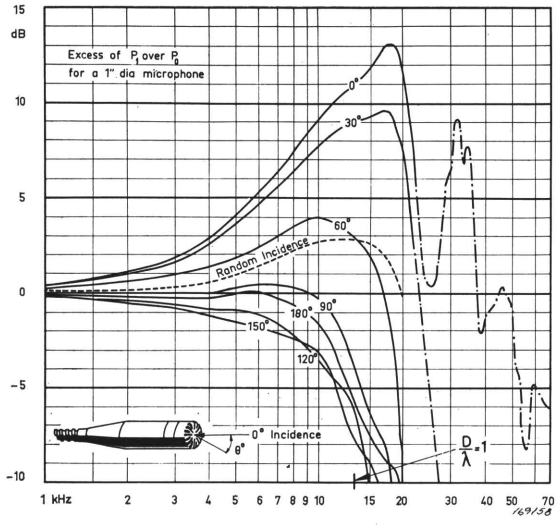
The sound pressure level of the calibrator is 94 dB. However, because of the increase in sound pressure at a microphone diaphragm when placed in a free sound field (Fig.2.3), there is a small correction to be subtracted from the calibration value when calibrating free field microphones. This correction is 0.4 dB for 1 in microphones and 0.2 dB for 1/2 in microphones. For pressure microphones no correction is required.

Procedure

1. Place the microphone into the coupler of the calibrator (Fig.2.2)
2. Press the button on the calibrator
3. Adjust the sound level meter to read according to the following table:

Fig. 2.2. Calibrator fitted on 2205 Sound level meter.

Microphone used		Sound Level or Sound Pressure Level
Pressure type	4132, 4144 4134	94 dB
Free field type	4117, 4131 4145	93.6 dB
	4133, 4148	93.8 dB



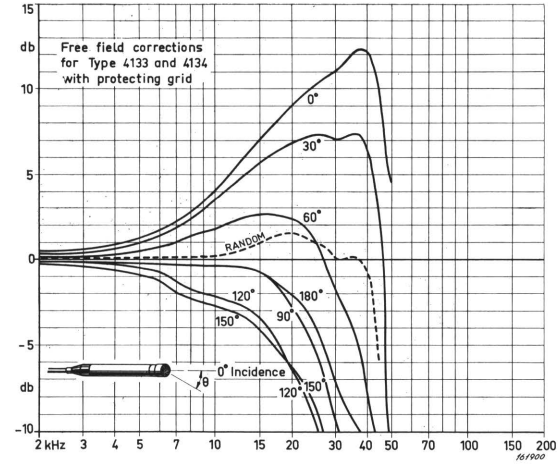


Fig. 2.3. Pressure characteristics with B & K 1" and 1/2" Microphones.

Battery change

If the signal does not last for at least a few seconds after the pushbutton on the calibrator has been released, the battery is replaceable. This is done after unscrewing the bottom black part of the calibration housing.

Fig. 2.4. Insertion of 9 V-battery in the Calibrator.

3. Description

The calibrator is based on a 1000 Hz stabilized oscillator which drives a piezoelectric bender. This bender is coupled to a membrane which produces a sound pressure in the coupler volume. As the system is adjusted to reso-

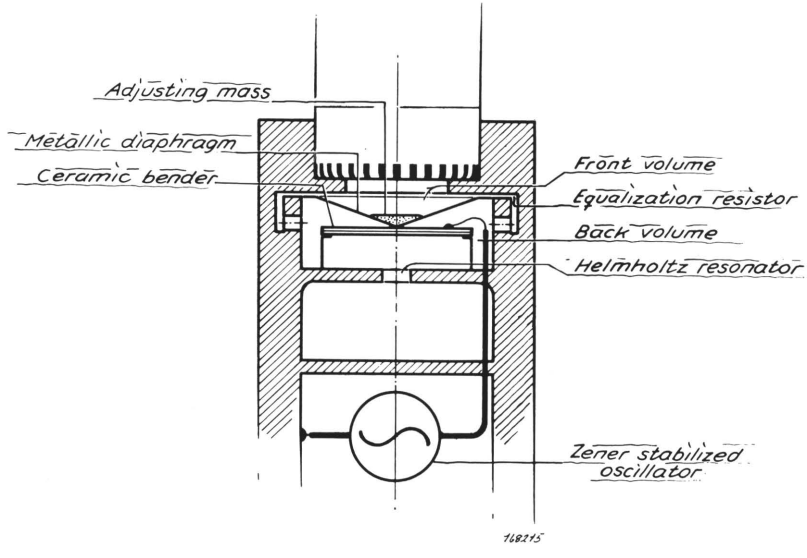


Fig. 3.1. Operation of 4230.

nate at 1000 Hz and is driven at this frequency, the equivalent volume is very high. In order to avoid influence on the stiffness of the volume behind the diaphragm caused by change in static pressure, a Helmholz-resonator construction is made. (Fig.3.2)
A built-in temperature compensation ensures accurate calibration over the whole temperature range of the calibrator. (Fig.3.3)
A hold circuit is included to facilitate operation. This circuit holds the signal

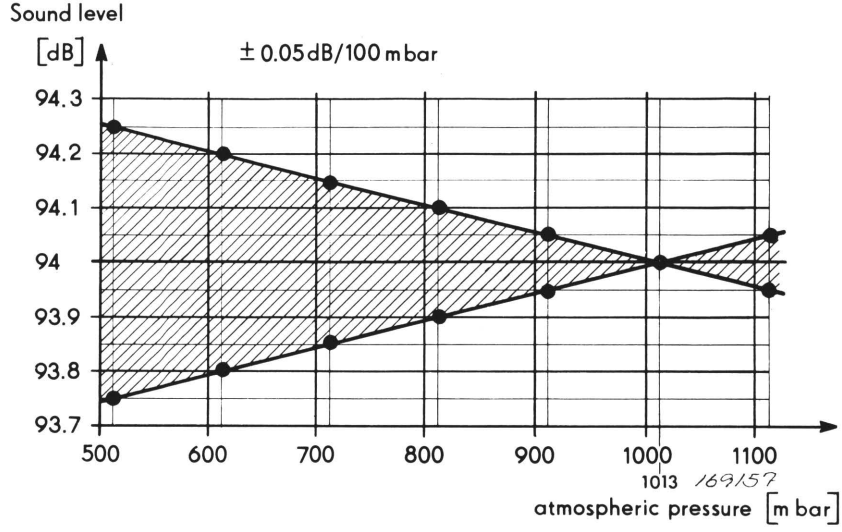


Fig. 3.2. Sound level depending on the Atmosphere pressure.

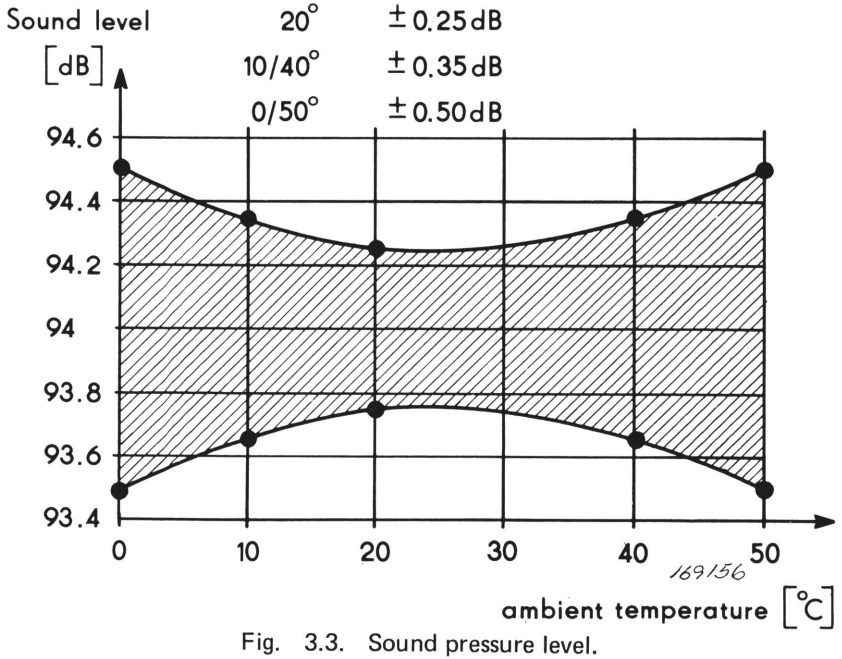


Fig. 3.3. Sound pressure level.

for up to one minute (with a new battery) after the pushbutton is released, thus leaving one hand free for adjustment of the sound measuring instrument. The hold circuit is also used as an indication of battery wear.
The mode of operation is shown in Fig.3.1.

4. Further calibration

The Sound Level Calibrator Type 4230 is made for field calibration of sound measuring systems. For complete calibration of condenser microphones with regard to sensitivity and frequency response, use should be made of the B & K Microphone Calibration Apparatus Type 4142 (Fig.4.). This includes equipment for reciprocity calibration to a very high accuracy, and electrostatic actuators for precise determination of microphone frequency response.

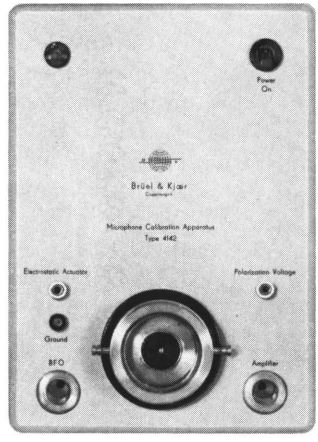


Fig. 4. Microphone Calibrating Apparature 4142.

5. Specifications

Frequency:	1000 Hz ±1.5%
Sound pressure level:	94 dB re 2×10^{-5} N/m^2 (1 N/m^2)
Accuracy:	±0.25 dB at 25°C ±0.35 dB between 10°C and 40°C ±0.50 dB between 0°C and 50°C
Influence of static pressure:	±0.05 dB per 100 mbar change in pressure between 500 mbar and 1100 mbar
Distortion:	Less than 1%
Microphone types:	1 in and 1/2 in
Power Supply:	Built-in battery 1 x 9V (IEC 6 F 22, NEDA 1604)
Battery check:	As long as the signal lasts for a few seconds the change in SPL is less than 0.05 dB.
Dimensions including leather case:	Length 110 mm Diameter 44 mm
Weight:	260 g.
Temperature range:	0 - 50°C
Equivalent volume:	$\|V\| >$ 200 cm^3 at 25°C $\|V\| >$ 100 cm^3 between 10°C and 40°C $\|V\| >$ 50 cm^3 between 0°C and50°C
Accessories:	1 Battery 1 leather case 1 adaptor

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