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type 4230

Sound Level Calibrator

FEATURES:

- Pocket size, portable unit
- Calibration accuracy ± 0,3 dB
- Frequency 1000 Hz, gives independence of weighting networks
- Calibration sound pressure level 94 dB = 1 Pascal= 1 N/m² = 10 μbar
- Extremely small influence of static pressure
- Sound pressure independent of microphone equivalent volume
- Fits B & K 1" and 1/2" microphones

USES:

- Calibration of sound measuring equipment



The Sound Level Calibrator Type 4230 is a pocket sized, battery operated sound source intended for quick and direct calibration of sound level meters and other sound measuring systems. It is designed to fit B & K 1" and 1/2" microphones, but with the correct adaptors it can be used for 1/4" and 1/8" microphones as well.

The calibration frequency is 1000 Hz, (the reference frequency for the standardized international weighting networks), so the same calibration value is obtained for all weighting networks (A, B, C, D and Linear). The calibration pressure of 94 ± 0,3 dB re 2×10^{-5} N/m² is equal to 1 Pa or 1 N/m², convenient for calibration. The principle of operation of the calibrator is shown in Fig.1. A stabilized 1000 Hz oscillator feeds a piezoelectric driver element which vibrates the diaphragm and creates the sound pressure level in the coupler volume. The system is driven at its resonant frequency, at which the equivalent coupler volume is more than 140 cm³. The sound pressure is therefore independent of the microphone's volume. This means that the exact fitting of the microphone in the coupler is not critical, an added assurance for non-experts.

The calibration procedure is simple. Fit the 4230 snugly over the microphone (see Fig.2), press the calibrator's push button and adjust the sensitivity of the sound measuring equipment until the meter indicates the correct sound pressure level. When the push button has been pressed to start the calibration, the signal will last for up to 1 minute depending on the condition of the battery.

Normally, the volume behind the diaphragm would have a certain stiffness which would be pressure dependent and would add to the overall stiffness of the system. This in turn would make the resonant frequency of the system pressure dependent. However, in the 4230 calibrator the volume behind the diaphragm is shaped like a Helmholtz res-

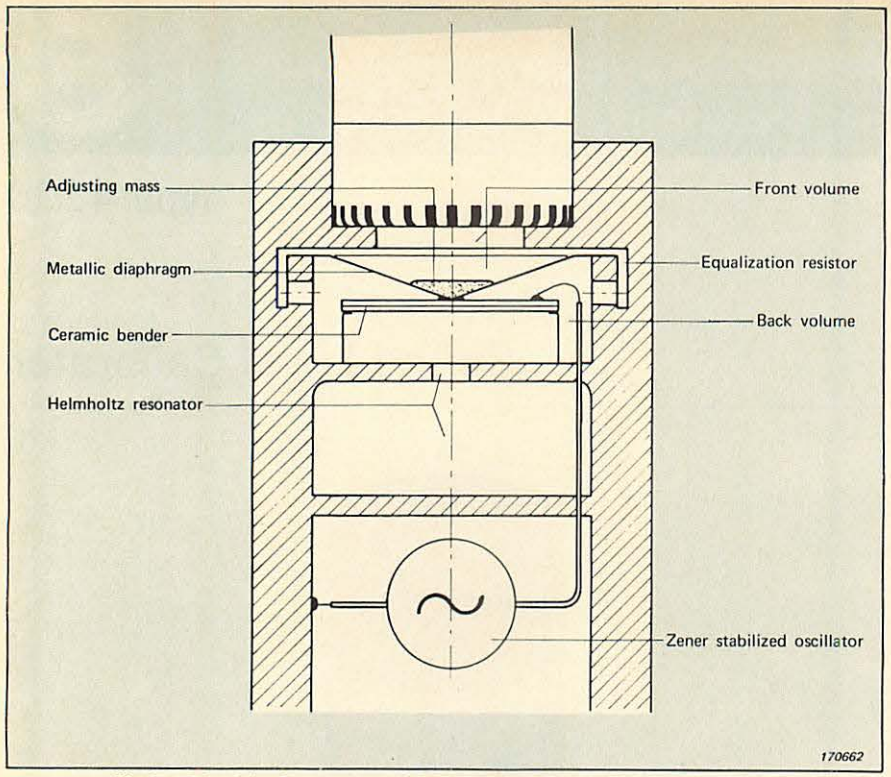


Fig.1. Principle of operation of the portable Sound Level Calibrator 4230

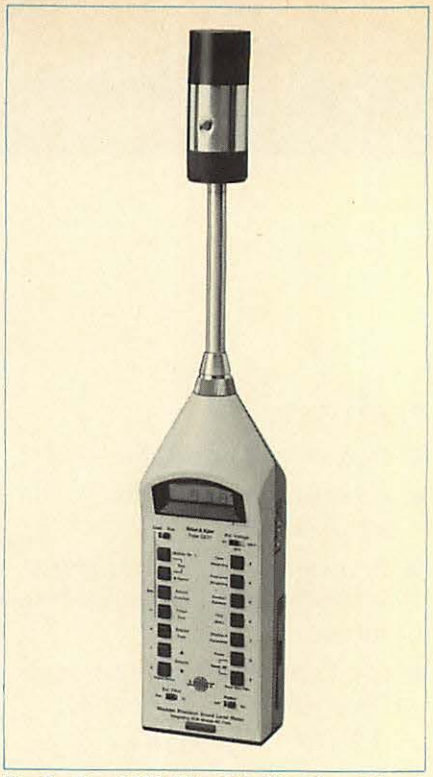


Fig. 2. The 4230 fitted to the Sound Level Meter 2231

onator, which eliminates the stiffness factor and makes the resonant frequency independent of ambient pressure. (The resonant frequency of a Helmholtz resonator depends only on the volume of the cavity and the length and cross section of the constricting neck). This means that the calibrator keeps its good characteristics even at very low static pressures.

The accuracy of calibration is within ± 0,3 dB at 25°C and within ± 0,5 dB over the operating temperature range of 0 to 50°C.

The battery condition is easily checked. If the signal stops as soon as the push-button is released, the battery needs replacing.

A leather protecting case which does not need to be removed to use the calibrator is supplied.

Specifications 4230

Sound Pressure Level:
94 dB re 2×10^{-5} Pa (or 1 Pa)

Accuracy of SPL:
At 1013 mbar when loaded with 1,333 cm^3 (corresponding to B & K microphones with protecting grid, and their respective adaptors)
± 0,3 dB at 23°C ± 3°C (68 to 79°F)
± 0,4 dB between 10 and 40°C (50 to 104°F)
± 0,5 dB between 0 and 50°C (32 to 122°F)

Frequency:
1000 Hz ± 1,5%

Equivalent Coupler Volume:
$|V| > 140\ cm^3$ at 23°C (73,4°F)
$|V| > 70\ cm^3$ between 10 and 40°C (50 to 104°F)
$|V| > 35\ cm^3$ between 0 and 50°C (32 to 122°F)

Distortion:
< 1%

Influence of Static Pressure:
± 0,05 dB/100 mbar from 500 mbar to 1100 mbar

Long Term Stability:
Better than ± 0,1 dB/year (expected for normal field use)

Microphone Types:
1" directly
1/2" with supplied adaptor

Power Supply:
Internal supply from 1 × 9 V transistor (IEC 6LF22, NEDA 1604) battery

Operation:
With a new battery the signal will last for up to one minute after contact is released

Battery Check:
As long as the signal continues for a few seconds after the contact is released the change in SPL is less than 0,05 dB

Dimensions:
(Including leather case)
Length: 115 mm (4,5")
Diameter: 44 mm (1,7")

Weight:
(Including leather case)
260 g (0,57 lb)

Accessories Included:
Adaptor for 1/2" microphones DB 0311
Leather case KE 0065
Battery 9 V transistor IEC 6LF22 (B & K order No. QB 0016)

Accessories Available:
1/2" to 1/4" Adaptor DB 0310
1/2" to 1/8" Adaptor DB 0352

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