

Measuring Microphones, Studio Microphones, Hydrophones and Accessory Equipment

type 4220

Pistonphone for Acoustic Calibration

FEATURES:

- Well defined sound source
- Few, highly stable parameters determine SPL
- High calibration level, 124 dB SPL at microphone diaphragm
- Accurate calibration within $\pm 0,15$ dB
- Transistorized frequency control
- Individually calibrated
- Battery operated
- Fits 1", 1/2", 1/4" and 1/8" microphones

USES:

- Direct calibration of sound measurement equipment
- Field and laboratory use
- Laboratory standard

The Pistonphone Type 4220 is a small, battery operated, high level precision sound source, which provides quick and accurate direct calibration of sound measuring equipment, tape recordings of sound etc. with an error of less than $\pm 0,15$ dB. It is always ready for use and can be utilized in the field under severe environmental conditions while still maintaining high accuracy. It is also extremely useful as a laboratory standard sound pressure level. The Pistonphone fulfils the recommendations of the IEC on the calibration of precision sound level meters. The calibration frequency, which is 250 Hz with the self-contained batteries, is controlled within $\pm 1\%$ by means of a transistor circuit. The piston arrangement, an original B & K design, consists of two pistons moving in opposite direction and en-

dures maximum stability and low non-linear distortion (see Fig.1).

The operation procedure is simple: Fit the microphone into the coupler of the Pistonphone and push the control switch to the "On" position and the Pistonphone will now produce a constant sound pressure level on the diaphragm of the microphone. The Pistonphone can be held in one hand in any position, while with the free hand the sensitivity of the sound measuring equipment is adjusted until a reading corresponding to the sound pressure level produced is obtained.

The Pistonphone fits the B & K 1", 1/2", 1/4" and 1/8" microphones and microphones having the same standard diameter, such as the types WE 640 AA, MR 103, etc. Fig.2



shows its use with 1" and 1/2" microphones. The Pistonphone can also be adapted to other types of microphones by means of special

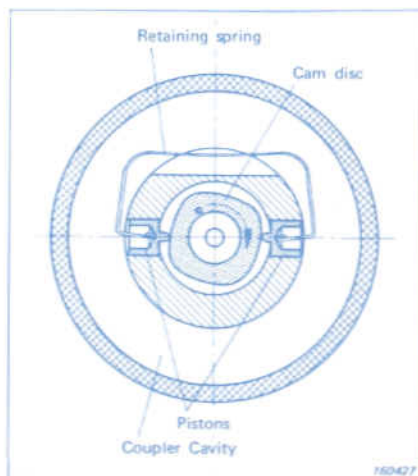


Fig.1. Cross sectional view showing the principle of operation

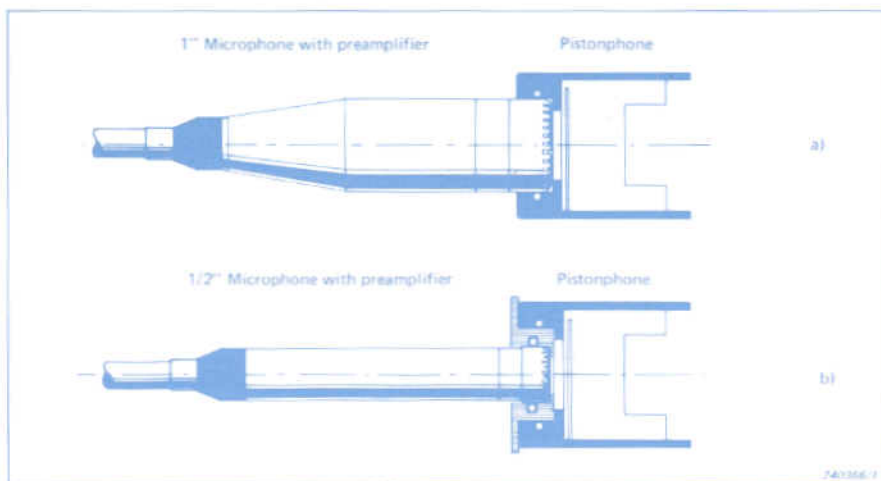


Fig. 2. Mounting B & K microphones on the Pistonphone
 a) 1" microphone
 b) 1/2" microphone. The total volume of the cavity is the same in both cases

adaptors. The sound level produced by the Pistonphone, when fitted to a B & K microphone is $124 \pm 0,2$ dB re 2×10^{-5} Pa. This high level allows correct calibration to be made even in very noisy surroundings. Each pistonphone is individually calibrated at normal atmospheric pressure. A barometer supplied with the Pistonphone gives the ambient pressure correction in dB, in the range 790 to 1040 mbar.

The Pistonphone is delivered with alkaline batteries, IEC LR 6 (QB 0013), mounted in a battery container DH 0236 (Fig.3), which enables very easy battery replacement. Fitted with alkaline batteries, the 4220 operates in the temperature range -10 to $+55^{\circ}\text{C}$ (14 to 131°F). The batteries can be checked by pushing the control switch of the Pistonphone to the "Batt." position where the fre-

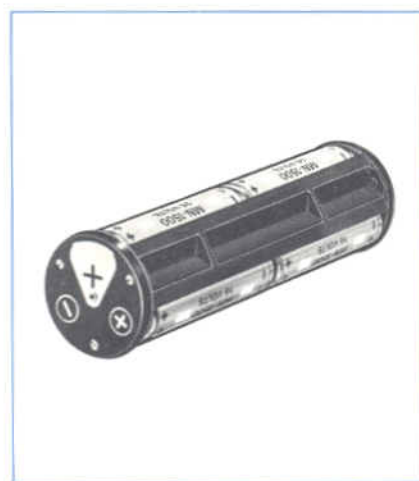


Fig.3. Battery container DH 0236 fitted with 6 batteries

quency should be higher than in the "On" position (approximately 320 Hz with new batteries).

The operating frequency of the Pistonphone can be varied from less than 30 Hz to maximum 320 Hz by using an appropriate external DC power supply. (In the range 30 Hz to 320 Hz the sound level is independent of the frequency).

Specifications 4220

Sound Pressure Level: (Individually calibrated)

124 dB (re 2×10^{-5} Pa) $\pm 0,2$ dB at
 Ambient Pressure: 1013 mbar
 Ambient Temp.: 23°C
 Ambient Humidity: 50% RH
 Effective Load Volume: $1,333 \text{ cm}^3$

Calibration Accuracy:
 $\pm 0,15$ dB

Frequency:

Pos. "On": 250 Hz $\pm 1\%$ between $+5$ and $+45^{\circ}\text{C}$ ($+41$ to $+113^{\circ}\text{F}$). 250 Hz $\pm 2\%$ between -10 and $+55^{\circ}\text{C}$ ($+14$ to $+131^{\circ}\text{F}$)
 Pos. "Batt.": approximately 320 Hz with new batteries

Nominal Effective Coupler Volume:

$19,733 \text{ cm}^3$ (at 250 Hz) including Nominal Effective Load Volume $1,333 \text{ cm}^3$

Distortion:

$< 3\%$ at 250 Hz

Temperature Range:

Operation: -10 to $+55^{\circ}\text{C}$ ($+14$ to

$+131^{\circ}\text{F}$) with batteries. -30 to $+55^{\circ}\text{C}$ (-22 to $+131^{\circ}\text{F}$) with external power supply

Storage: -40 to $+70^{\circ}\text{C}$ (-40 to $+158^{\circ}\text{F}$) with batteries removed

Influence of:

Ambient Pressure: SPL is proportional to the ambient pressure. (Correction Barometer supplied)

Ambient Temperature: Within $\pm 0,002$ dB/ $^{\circ}\text{C}$ from -10 to $+55^{\circ}\text{C}$

Ambient Humidity: -12×10^{-5} dB per % Relative Humidity

Effective Load Volume: See Manual

Batteries:

6 batteries IEC LR 6
 If frequency (speed of motor) increases when switching from "On" to "Batt." position, then battery voltage is sufficient

Dimensions:

Length: 224 mm (8.7 in.)

Diameter: 36 mm (1.4 in.)

Weight:

Pistonphone with batteries: 0,7 kg (1,5 lb)

Total weight of case containing pistonphone, adaptors and correction barometer: 1,6 kg. (3,5 lb)

Correction Barometer Specifications:

Pressure Range: 790 to 1040 mbar

Accuracy (1 year): better than $\pm 0,1$ dB at 23°C ; $\pm 0,2$ dB from -10°C to $+50^{\circ}\text{C}$

Accessories included:

6 alkaline batteries IEC LR 6, size AA	QB 0013
1 battery container	DH 0236
1 adaptor for 1/2" microphones	DB 0311
1 adaptor for 1/4" microphones	DB 0310
1 adaptor for 1/8" microphones	DB 0352
1 Correction Barometer	UZ 0003