

Portable Sound Level and Vibration Meters Group 4

type 2203

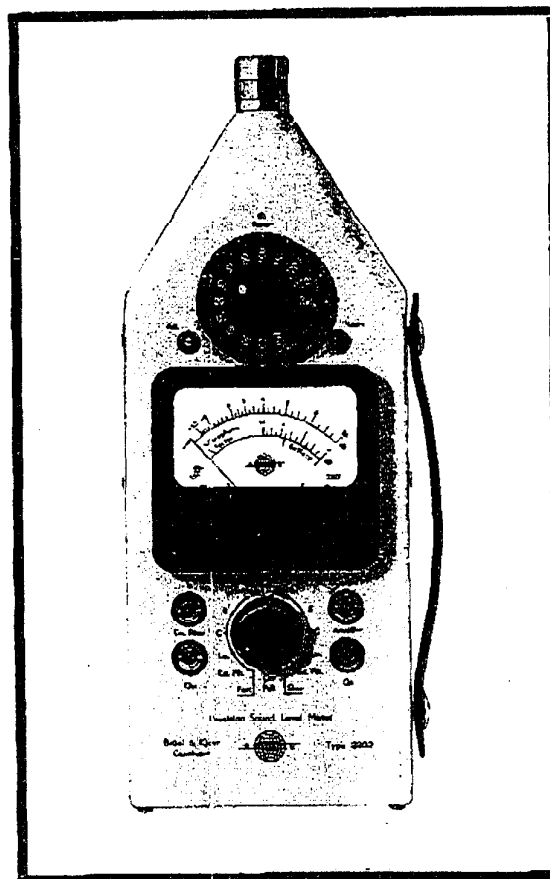
precision sound level meter

Features:

- Portable, solid state, battery operated
- Rugged and compact construction
- Fulfils the IEC 179, DIN and ANSI recommendations. Approved by PTB 5.21/003
- Equipped with individually calibrated precision condenser microphone
- Conical front gives minimum sound field disturbance
- Low impedance output for connection to recorders
- Built-in A, B and C weighting
- Two meter dampings
- Performs as frequency analyzer with Octave Filter Set
- Wide selection of accessories

Precision Sound Level Meter Type 2203

This Sound Level Meter has been designed as a strong compact unit able to perform sound and vibration measurements of almost any kind with the highest degree of accuracy. The instrument fulfils the requirements of IEC R179 and DIN 45633 part 1 for precision sound level meters as well as IEC R 123 and ANSI S 1.4-61 for general purpose sound level meters. The instrument is powered from 3 standard 1.5 volt batteries giving 10 hours of continuous operation. Battery condition can be checked on the meter. The instrument has sockets for connection of external filters as well as a recorder output for connection of headphones, level recorders etc. The built-in reference voltage provides easy calibration.



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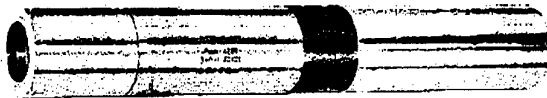
Uses:

- Acoustics, measurement of sound insulation, sound distribution etc.
- Noise and vibration measurements in industry for quality inspection and development
- Noise and vibration measurements for health protection
- Audiometer calibration

Sound Measurements

As standard, the instrument is equipped with a 1" diameter B & K precision condenser microphone Type 4145, giving a maximum dynamic range from 19 to 134 dB and linear frequency range from 10 Hz to 18 kHz. For measurement of higher sound pressure levels and for wider frequency range the B & K 1/2" or 1/4" microphones can be used, fitted with special adaptors. Microphones may also be attached to extension rods and cables to give improved omnidirectional characteristics, reduced disturbance of the measured sound field, and measurements in inaccessible places. A Random Incidence Corrector is available for improving the omnidirectional characteristic of the 1" microphone. Nose Cones and Wind Screens are available for reduction of wind noise.

The instrument can measure the linear sound pressure level or use can be made of the built-in weighting networks for measurement of the weighted sound level. Two meter dampings in accordance with the standard recommendations can be chosen. Acoustical calibration can be made either with the Pistonphone Type 4220 at 250 Hz - 124 dB within ± 0.2 dB accuracy or with the Sound Source Type 4230 at 1000 Hz - 94 dB, within ± 0.25 dB accuracy.



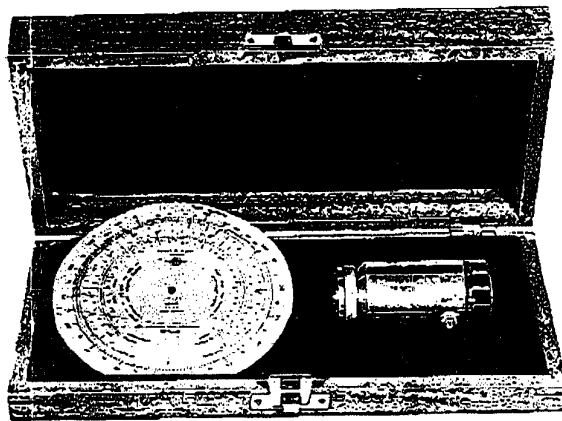
Pistonphone Type 4220.



Sound Source Type 4230.

Vibration Measurements

When the microphone is replaced by the Input Adaptor JJ 2612 and one of the B & K accelero-

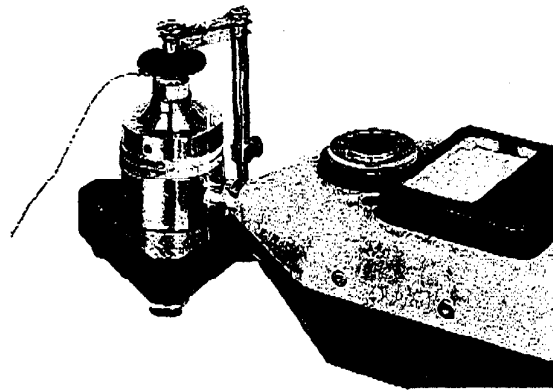


The Integrator ZR 0020 with Calculating Disc.

meters is connected the instrument functions as a vibration meter. Additional connection of the Integrator ZR 0020 between the accelerometer and Sound Level Meter also allows vibration velocity and displacement to be measured. A calculation disc delivered with the Integrator makes easy conversion of the dB reading into vibration units.

Audiometer Calibration

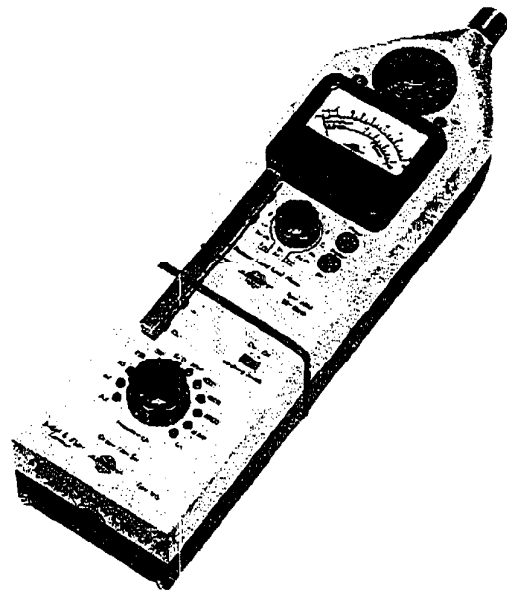
When the microphone is replaced by the Artificial Ear Type 4152 or 4153 a precise, compact and fully portable calibrator for audiometers is achieved.



The 2203 equipped with Artificial Ear Type 4152.

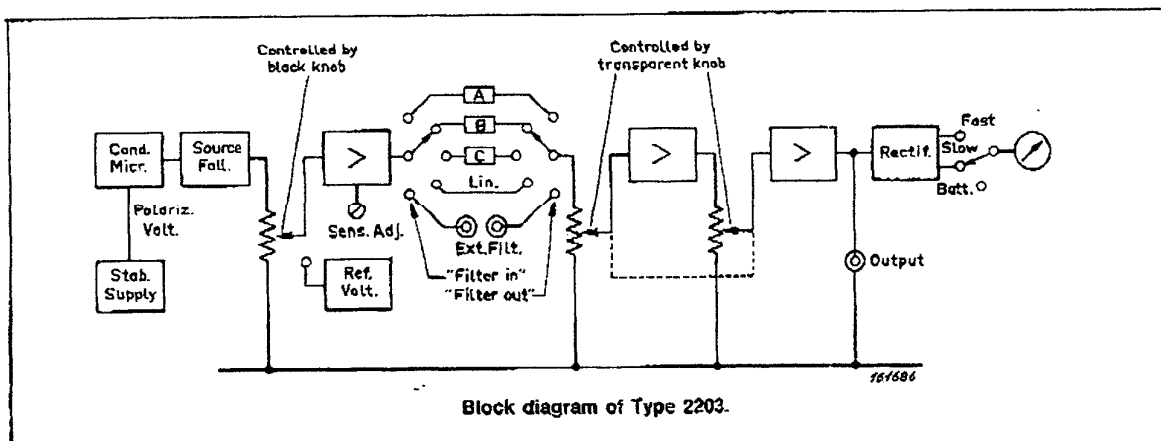
Frequency Analysis

For frequency analysis of the measured sound or vibration level the Octave Filter Set Type 1613 screws directly onto the sound level meter, and connects electrically with a connection bar.



The 2203 equipped with Octave Filter Set Type 1613.

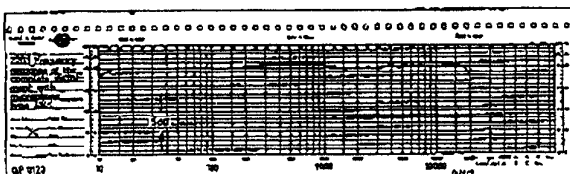
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Description

The Precision Sound Level Meter Type 2203 is built as a strong compact unit. It contains a Condenser Microphone with associated polarization voltage supply and FET preamplifier, a low-noise fully transistorized amplifier and a meter circuit with moving coil meter. A built-in calibration signal provides a ready check of the amplifier and meter circuit.



Frequency response of complete instrument including microphone Type 4145.

Microphone

The B & K Microphone Type 4145 employed in the sound level meter is a precision condenser microphone. This microphone is designed to have a linear frequency response when used for free field sound measurements with 0° angle of incidence. A calibration chart with frequency response curve and sensitivity data (individually determined for each microphone) is supplied with the Sound Level Meter. The microphone is extremely reliable and unaffected by humidity and temperature variations. The sensitivity of the microphone is approximately 50 mV/N/m^2 ($5 \text{ mV}/\mu\text{bar}$) when a polarization voltage of 200 volts is applied.

Amplifier

The input stage of the amplifier contains a field effect transistor coupled as a source follower in order to obtain a high input impedance. Each of the three sections of the amplifier is preceded by an attenuator. External filters can be inserted between the first and second sections, or the

built-in weighting networks can be switched in by means of a knob on the front plate. When this knob is set to its linear position the frequency response of the amplifier is linear from 10 Hz to 25 kHz to within $\pm 2 \text{ dB}$. The built-in weighting networks are in accordance with the IEC recommendation.

The amplifier output section is supplied with an output socket making it possible to use the instrument in conjunction with a level recorder, tape recorder etc. The supply voltage for the amplifiers as well as the microphone polarization voltage is produced by a transistor oscillator.

Meter and Rectifier Circuit

The meter rectifier circuit is of the quasi-RMS type as required in the standard recommendations. The meter is equipped with two different damping characteristics, also in accordance with the standards for sound level meters. The meter is of the ribbon suspended moving coil type. To facilitate measurement in dim or badly lit places, a meter light can be switched on by means of a springloaded pushbutton.

Complete Sets

The instrument can be ordered with accessories according to need, however, to simplify the ordering two sets have been assembled containing the most commonly used accessories. The sets are delivered in the sturdy fiberglass carrying case KE 0055 with separate compartments for each item.

The two sets include:

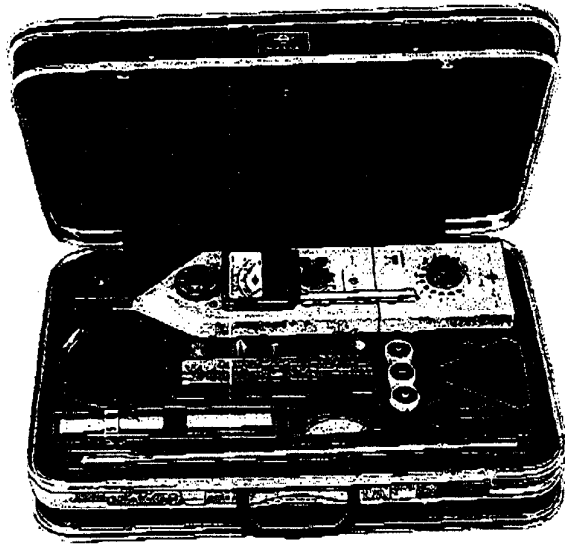
Audiometer Calibrator Type 3502

Precision Sound Level Meter	Type 2203
with standard accessories	Type 1613
Octave Filter Set	Type 4220
Pistonphone	Type 4152
Artificial Ear	Type 4144
Microphone 1"	KE 0055
Carrying Case	

Sound and Vibration Set Type 3501

Precision Sound Level Meter
with standard accessories
Octave Filter Set
Pistonphone
Microphone 1/2"
Accelerometer set
Extension Rod
Windscreen
Random Incidence Corrector
Nose Cone 1"
Nose Cone 1/2"
Adaptor for tripod
Integrator
Extension Cable
Carrying Case

Type 2203
Type 1613
Type 4220
Type 4133
Type 4312
UA 0039
UA 0082
UA 0055
UA 0051
UA 0052
UA 0028
ZR 0020
AO 0033
KE 0055



The Sound and Vibration Set Type 3501.

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Specifications 2203

Measuring Range:

	1" Microphone	1/2" Microphone
Linear	38 to 134 dB	57 to 148 dB
C weighting	28 to 135 dB	48 to 148 dB
B weighting	21 to 134 dB	43 to 148 dB
A weighting	19 to 134 dB	39 to 148 dB
Octave	14 to 134 dB	36 to 148 dB
Third octave	10 to 134 dB	31 to 148 dB

Note: The stated values are RMS values. Max. allowable peak values are 10 dB higher. Signal-to-noise ratio is approx. 5 dB for lower limit.

Frequency Range: (± 2 dB)

1" microphone 4145
10 Hz to 18 kHz.
1/2" microphone 4133
10 Hz to 25 kHz.

Input Impedance:

2 G Ω /2.6 pF.

Output Impedance:

350 Ω . Max. Load 10 k Ω or 1000 pF
for less than 0.5 dB error.

Output Voltage:

15 V peak. 3 V RMS for full deflection on meter.

External Filters:

Output Impedance EXT FILTER IN 25 Ω .
Input Impedance EXT FILTER OUT 146 k Ω .

Inherent Noise:

Linear: max. 30 μ V referred to input.
Curve A: max. 4 μ V referred to input.

Meter:

Scale graduated in dB from -10 to +10 dB.
Square law rectifier for signals with crest factor up to 3.
Scale for battery check.
Two standardized meter dampings.

Batteries:

3 \times 1.5 V. IEC Type R20 (IEC Publication 86-2).

Battery Life:

25 hours of intermittent operation.
10 hours of continuous operation.

Temperature Range:

-10°C to 60°C (14°F to 140°F).

Dimensions:

9 \times 12 \times 31 cm (4 \times 5 \times 12.5 in).

Weight:

2.7 kg (6 lb).

Accessories included:

Input Adaptor JJ 2612
1" Condenser Microphone Type 4145
3 Screened Plugs JP 0006
3 Batteries QB 0004