Pistonphone Type 42AA

Product Data and Specifications

Typical applications

- ***Reference calibration source***
- ***Precision microphone calibrations***
- ***Microphone comparisons***
- ***P-I index measurement at 250 Hz***

The G.R.A.S. Pistonphone Type 42AA (Fig. 1) is a battery-operated, precision sound source for accurate and reliable calibration of measurement microphones, sound level meters and other sound measuring equipment.

With a microphone placed in the coupler of the pistonphone, the calibration level and frequency is:

- 114 dB re. 20 µPa (±0.08 dB) at 250 Hz
  (note: 114 dB is equivalent to 10 Pa)

  with A-weighting applied;
- 105.4 dBA re. 20 µPa (±0.08 dB) at 250 Hz

At a static ambient pressure of 101.3 kPa, no further correction factors need be applied.

The Type 42AA is an extremely stable laboratory-standard sound source which can also be used for field calibrations - it retains its high accuracy even under hostile environmental conditions.

The Type 42AA complies with all the requirements of IEC Standard 942 (1988) *Sound Calibrators* Class 1 with an included barometer as well as Class 0 with a precision barometer (not included).

The Type 42AA is normally delivered for calibrating ½-inch microphones directly since these are most commonly used but can be delivered with a 1-inch coupler (RA0023) for calibrating 1-inch microphones directly if preferred. Please state preference when ordering.

The pistonphone works on the principle of two reciprocating pistons actuated by a precision-machined cam with a sinusoidal profile. The rotation speed of the cam is controlled to within 0.5% via a tachometer signal in a feed-back loop. The Type 42AA has a dual-colour LED above the ON/OFF switch to indicate both battery condition and stable operation. When the pistonphone is operating properly, the LED shows green, indicating that the speed of the cam is correctly locked to give 250 Hz. If it shows red while the pistonphone is switched on, the speed is incorrect; most likely because of low batteries.

Fig. 1 Pistonphone Type 42AA 114 dB at 250 Hz. Shown with Barometer ZC0002K - for applying corrections for ambient pressure

The operating procedure is straight forward, simply fit the microphone into the coupler of the pistonphone and switch on. The pistonphone will now produce a constant sound pressure level on the diaphragm of the microphone.

The Pistonphone Type 42AA is compatible with

Vers.09-11-04

G.R.A.S.
Sound & Vibration

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G.R.A.S. ½-inch, ¼-inch and ⅛-inch microphones and all other microphones having the same standard diameters. Adapters are included for calibrating ¼-inch and ⅛-inch microphones. Where applicable, the coupler RA0023 is also available for calibrating 1-inch microphones.

Each pistonphone is factory adjusted to give 114 dB ± 0.08 dB re. 20 µPa and is supplied with an individual calibration certificate stating the exact value to within ± 0.05 dB and the test conditions. Since the output level of a pistonphone depends on the static ambient pressure, the Type 42AA is delivered with a barometer (Fig. 1) which shows directly on a printed scale what must be added or subtracted to the output level of the pistonphone. For use as a Type 0 calibrator, a precision barometer (not included) with an accuracy of ± 1 hPa or better should be used. The barometric correction at a given altitude very seldom varies by more than ± 0.2 dB.

Adapters for the G.R.A.S. Environmental Microphone Type 41AL and Outdoor Microphone Systems Types 41AM and 41CN are available for use with Pistonphone Type 42AA fitted with a 1-inch microphone coupler RA0023.

A two-port calibration coupler for ½-inch microphones (RA0024) is available for making comparison calibrations with a reference microphone . This can also be used for measuring the P-I (Pressure-Intensity) index of intensity systems at 250 Hz.

Octopus couplers are also available for simultaneously calibrating upto 8 mirophones.

Specifications

Sound pressure level:
Nominal: . . . . . 114 dB re. 20 µPa
Individually calibrated under the following reference conditions:-
Ambient pressure: . . . . . 101.3 kPa
Ambient temperature: . . . . . 20 °C
Ambient humidity: . . . . . 65 % RH

Calibration accuracy:
± 0.08 dB

Frequency:
250 Hz ± 0.5 %

Distortion:
< 1.5 %

Nominal effective coupler volume:
Including 0.05 cm^3 microphone load volume:
15.6 cm^3

Temperature range:
Batteries permitting: . . . . . − 10 °C to + 55 °C

Batteries:
Four standard LR6-AA alkaline cells

Dimensions:
Length: . . . . . 175 mm (6.89 in)
Width: . . . . . 35 mm (1.38 in)
Height: . . . . . 35 mm (1.38 in)
Weight: . . . . . 325 g (0.7 lbs)

Accessories included:
Adapter for ½-inch microphones [1]: RA0048
Adapter for ¼-inch microphones: RA0049
Adapter for ⅛-inch microphones: RA0069
Barometer: ZC0002K
Four LR6-AA alkaline cells: EL0001

Accessories available:
Adapter for Outdoor Microphone System [1]:-
Type 41AM: RA0009
Type 41CN: RA0041
Adapter for Environmental Microphone [1]:-
Type 41AL: RA0010
1-inch microphone coupler: RA0023
Two-port calibration coupler: RA0024
Octopus coupler (¼-inch mics.) [2]: RA0025
Octopus coupler (½-inch mics.): RA0072
Hydrophone-coupler Adapter: RA0055
Coupler for Hydrophone:-
Type 10CT: RA0043
Type 10CC: RA0046
(to be used with Coupler Adapter RA0055)
Type 10CD: RA0078

[1] Applies only to pistonphones fitted with a 1-inch microphone coupler RA0023
[2] Also for the G.R.A.S. Array Microphone Type 40PR

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