

Pistonphone Type 42AC

Product Data and Specifications

Typical applications

- *Reference sound source*
- *Precision microphone calibrations*
- *Microphone comparisons*
- *Precision hydrophone calibrations*

The G.R.A.S. Pistonphone Type 42AC (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 is:

- 134 dB¹ re. 20 µPa
- 125.4 dBA re. 20 µPa (with A-weighting applied)

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

The Type 42AC 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 42AC complies with all the requirements of IEC Standard 942 (1988) Sound Calibrators Class 1 when corrected with barometer ZC0003K (included).

The Type 42AC is delivered with a ½" coupler (RA0048) for calibrating ½" microphones directly. The Type 42AC-S1 is delivered with a 1" coupler (RA0023) for calibrating 1" microphones directly.

The pistonphone works on the principle of four 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 42AC has a dual-colour LED above the ON/OFF switch to indicate both battery condition and stable operation. When the pistonphone is



Fig. 1 Pistonphone Type 42AC: 134 dB at 250 Hz. Shown here with Barometer ZC0003K, which is used for applying corrections for ambient pressure

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.

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 42AC is compatible with G.R.A.S. ½", ¼", and ⅛" microphones and all other microphones having the same standard diameters. Adapters are included for calibrating ¼" and ⅛" microphones. Where applicable, the coupler RA0023 is also available for calibrating 1" microphones.

¹ 134 dB is equivalent to 100 Pa

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Each pistonphone is factory calibrated with an accuracy of ± 0.14 dB re. $20 \mu\text{Pa}$ and is supplied with an individual calibration certificate stating the exact value and test condition. The exact value is adjusted to be 134 dB within ± 0.05 dB under reference conditions. Since the output level of a pistonphone depends on the static ambient pressure, the Type 42AC 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. 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 42AC fitted with a 1" microphone coupler RA0023. A two-port high-pressure calibration coupler for $\frac{1}{2}$ " microphones (RA0042) 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 up to 8 microphones.

Specifications

Sound pressure level: Nominal: 134 dB re. $20 \mu\text{Pa}$ Individually calibrated under the following reference conditions:- Ambient pressure: 101.3 kPa Ambient temperature: 20°C Ambient humidity: 65% RH	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)
Calibration accuracy: Absolute: ± 0.14 dB at reference conditions Accuracy when corrected for ambient pressure with: ZC0003K ± 0.2 dB	Accessories included: Coupler for $\frac{1}{2}$ " microphones ¹ : RA0048 Coupler for 1" microphones ² : RA0023 Adapter for $\frac{1}{4}$ " microphones: RA0049 Adapter for $\frac{1}{8}$ " microphones: RA0069 Barometer: ZC0003K Four LR6-AA alkaline cells: EL0001
Frequency: 250 Hz $\pm 0.5\%$	Accessories available: Adapter for Outdoor Microphone System ¹ :- Type 41AM: RA0009 Type 41CN: RA0041 Adapter for Environmental Microphone ¹ :- Type 41AL: RA0010 Coupler for 1" microphones: RA0023 Coupler for $\frac{1}{2}$ " microphones: RA0048 Digital precision barometer: RA0168 Two-port calibration coupler: RA0042 Octopus coupler ($\frac{1}{2}$ -inch mics.): RA0072
Distortion: Max. 2%	
Nominal effective coupler volume: 12530 mm ³ (including effective load volume of microphone type 40AG)	
Temperature range: Batteries permitting: -10°C to $+55^\circ\text{C}$	
Batteries: Four standard LR6-AA alkaline cells	

¹ Applies only for 42AC

² Applies only for 42AC-S2

G.R.A.S. Sound & Vibration reserves the right to change specifications and accessories without notice

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