GRAS 42AP

Intelligent Pistonphone Class 0

Sound pressure level: 114 dB
Frequency: 250 or 251.2 Hz
ANSI: S1.40
IEC: 60942 (2018) LS

The GRAS 42AP Pistonphone is a battery-operated, precision sound source for accurate and reliable calibration of measurement microphones, sound level meters and other sound measuring equipment.

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Typical applications and use

- Reference calibration source
- Precision microphone calibrations
- Microphone comparisons
- P-I index measurement at 250 Hz or 251.2 Hz
- Calibration independent of atmospheric pressure and altitude

Design

42AP has a built-in precision barometer and a thermometer. Via its display and RS-232 interface, the user can read the actual corrected sound pressure level, as well as the pistonphone's temperature and ambient static pressure.

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 0.1% via a tachometer signal in a feed-back loop.

With a microphone placed in the coupler of the pistonphone, the calibration level and frequency is nominally 114 dB* re. 20 Pa at either 250 Hz or 251.2 Hz. The actual sound pressure level, corrected for static ambient pressure, is shown on the display of the Pistonphone.

The display can also show the A-weighted sound pressure level after correcting it for using an A-weighting filter.

An individual calibration chart is delivered with each Pistonphone.

The display can be switched to show any of the following:

- Actual corrected sound pressure level in decibels
- Actual corrected sound pressure level in decibelsif measured with an A-weighting filter
- Static air pressure in h Pa
- Calibration temperature in °C
- Calibration temperature in °F

The frequency of the pistonphone can be programmed, via its RS-232 interface, to be either 250 Hz or 251.2 Hz.

Remote Control via RS-232 Interface

Commands and responses, comprising ASCII characters, can be sent to and from the Pistonphone via its RS-232 interface, using a suitable utility program.

The interface comprises:

- Connector: RS-232 9-pin D-sub using adapter cable AA0050
- RS-232: 9600,8,n,1 (i.e. 9600 bits per second, 8data bits, no parity bit, 1 stop bit)

There is no flow control/handshaking; therefore commands must be sent one by one, waiting for each response. The input buffer is 32 bytes; in case of overflow, a response "Buffer overflow" will be submitted. This will not happen under normal conditions.

Commands and Responses

Two types of command are used. These are divided up as follows:

1. Interrogational commands

   Return information about the Pistonphone, its setup parameters, and measured ambient conditions

2. Setup commands

   For changing setup parameters and controlling the Pistonphone.

Syntax

1. Commands are not case sensitive.

2. All commands are executed by first typing inthe command then pressing the key

Couplers

The 42AP is delivered for calibrating ½" microphones directly since these are most commonly used. A 1" coupler (RA0023) for calibrating 1" microphones is also included.

Operation

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 42AP 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 or, optionally, 251.2 Hz. If it shows red while the pistonphone is switched on, the speed is incorrect; most likely because of low batteries.

Compatibility

The Pistonphone 42AP is compatible with GRAS 1/2", 1/4", and 1/8" microphones and all other microphones having the same standard diameters.

Adapters are included for calibrating 1/4" and 1/8" microphones. Use the 1" coupler RA0023 for calibrating 1" microphones.

Adapters for the GRAS Environmental Microphone 41AL and Outdoor Microphone Systems 41AM and 41CN are available for use with the 42AP Pistonphone fitted with the 1" microphone coupler RA0023.

Precision

The GRAS 42AP 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. It complies with all the requirements of IEC Standard 60942 (2018) LS.

Each pistonphone is factory calibrated with an accuracy of ±0.09dB re. 20 Pa and is supplied with an individual calibration certificate stating the exact value and test condition. The exact value is adjusted to be 114 dB within ±0.05dB under reference conditions.

Since the output level of a pistonphone depends on the static ambient pressure, the 42AP has a built-in barometer which shows directly on a LCD the actual corrected sound pressure level.

When corrected for ambient pressure, the calibration accuracy is within ±0.1dB

Frequency	Hz	250 / 251.2 (±0.1%)
Sound pressure level	dB	114 re. 20 Pa
Power supply, external	Vdc	6 (125 mA)
ANSI standard		S1.40
IEC standard		60942
Temperature range, operation	°C / °F	-10 to 55 / 14 to 131
Battery type		4 x AA alkaline (IEC LR 6)
Weight	g / oz	437 / 15.415

Calibration Accuracy at reference conditions:
1/2" microphone: ±0.09 dB
1" microphone: ±0.2 dB

GRAS Sound & Vibration reserves the right to change specifications and accessories without notice.

Included

GRAS RA0023	1" microphone coupler
GRAS RA0048	Adapter for ½" microphones. For pistonphone fitted with the 1" microphone coupler RA0023
GRAS RA0049	Adapter for ¼" microphones
GRAS RA0069	Adapter for $^{1}/_{8}$" microphones
GRAS EL0001	Four LR6-AA alkaline cells

Optional

GRAS RA0009	Adapter for Outdoor Microphone System 41AM. For pistonphone fitted with the 1" microphone coupler RA0023
GRAS RA0041	Adapter for Outdoor Microphone System 41CN. For pistonphone fitted with the 1" microphone coupler RA0023
GRAS RA0010	Adapter for Environmental Microphone 41AL. For pistonphone fitted with the 1" microphone coupler RA0023
GRAS RA0024	Two-port calibration coupler for ½" microphones
GRAS RA0090	94 dB Pistonphone coupler

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GRAS Worldwide

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About GRAS Sound & Vibration

GRAS is a worldwide leader in the sound and vibration industry. We develop and manufacture state-of-the-art measurement microphones and related equipment for industries where acoustic measuring accuracy and repeatability are of the utmost importance. This includes applications and solutions for customers within the fields of aerospace, automotive, audiology, consumer electronics and other highly demanding industries. GRAS microphones are designed to live up to the high quality, durability and accuracy that our customers have come to expect, trust and require.
GRAS Sound & Vibration is represented through subsidiaries and distributors in more than 40 countries and is part of Axiometrix Solutions, a leading test solutions provider comprised of globally recognized measurement brands. Read more at www.grasacoustics.com

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