

Acoustic Calibration Equipment



G.R.A.S.
SOUND & VIBRATION



High-precision acoustic calibration equipment

G.R.A.S. 40EU & 40AU

Laboratory Reference Microphones

G.R.A.S. high-precision laboratory reference microphones are designed for use in demanding calibration laboratory environments where long-term acoustic measurement accuracy and stability are of the utmost importance.

Available in both 1" (G.R.A.S. 40EU) and 1/2" (G.R.A.S. 40AU) versions, G.R.A.S. laboratory reference microphones are designed and manufactured to the IEC 61094-2 reference standard and recognized by some of the world's most prominent international metrology laboratories for their quality and performance.

In addition, the G.R.A.S. 40EU pressure microphone, featuring a special front cavity design, is equivalent in specification to the Western Electric 640AA microphone, originally accepted by Bell Laboratories as the industry's first reference microphone.

Both types are typically used to perform pressure calibration functions in acoustic couplers, such as reciprocity or traditional pistonphone calibration.

G.R.A.S. 42AP

Patented Intelligent Pistonphone Calibrator

For the optimum performance of measurement microphones, G.R.A.S. recommends use of high-precision pistonphone calibrators. These portable handheld calibrators generate a 250 Hz tone, at which typical microphone response is flat, providing greater likelihood of accurate calibration results. Use of pistonphone calibrators facilitates the reliable* level calibration of laboratory measurement microphones and can allow for field checks of complete acoustic measurement systems.

Traditional pistonphones require use of a separate barometer for applying static pressure corrections. The new patented G.R.A.S. 42AP Intelligent Pistonphone Calibrator has a built-in precision barometer, allowing for automatic in-situ correction of the static pressure and readout of actual corrected pressure level via its display or RS-232 interface. The G.R.A.S. 42AP pistonphone will also readout the exact static air pressure at its position and temperature (°C or °F), and corrects for possible A-weighting. It is IEC 60942 (2003) LS compliant. The unit is delivered with calibrated couplers and adapters for 1", 1/2", 1/4" and 1/8" microphones and an interface cable.

*Precision calibration requires stable test conditions and sufficient settling time.

G.R.A.S. 42AE

Low-frequency Calibrator to 0.01 Hz

Infra-sound measurement requirements are becoming increasingly more prevalent within environmental monitoring applications, where the monitoring of low-frequency sound disturbances from wind turbines and power plants are of heightened concern.

To ensure precise and reliable data collection, which is often presented as evidence during legal proceedings, it is critical that the low-frequency behavior of measurement microphones is known and documented. For this purpose, G.R.A.S. has introduced the G.R.A.S. 42AE Low-frequency Calibrator, offering calibration down to 0.01 Hz.

Designed for use with both front and rear-vented G.R.A.S. measurement microphones, the two-port configuration of the G.R.A.S. 42AE permits simultaneous monitoring of actual sound pressure in the coupler by a reference microphone with the microphone under test. Sound pressure can alternatively be monitored using the voltage output proportional to the pressure in the coupler. The built-in, DC-coupled power amplifier enables the calibrator to be used for swept-sine, broadband and step function investigations. Various types of adapters, for calibration of 1/8" to 1" microphones and preamplifiers are included.



G.R.A.S. 14AA

High Gain, High Voltage Actuator Supply

The G.R.A.S. 14AA is a high gain, high voltage amplifier, designed to serve as a power supply for driving electrostatic actuators, as well as standard measurement microphones when used as sound sources.

The G.R.A.S. 14AA can drive an electrostatic actuator with a 300 V peak-to-peak signal, superimposed on 800 VDC. Its wide frequency range makes it possible to determine pressure frequency response of condenser microphones from 200 Hz to 200 kHz. The G.R.A.S. 14AA can be connected directly to an external signal generator or generator output of any standard signal analyzer.

The G.R.A.S. 14AA, together with specified models of G.R.A.S. electrostatic actuators, may be used to comply with the IEC 61094-6 regulatory standard, "Measurement microphones - Part 6: Electrostatic actuators for determination of frequency responses."

The product is designed to be compatible with G.R.A.S. RA0014 and G.R.A.S. RA0015 electrostatic actuators, as well as other manufacturers' models.

G.R.A.S. RA0014 & RA0015

Electrostatic Actuators

The G.R.A.S. RA0014 is an electrostatic actuator, designed for testing the frequency response of both G.R.A.S. and other industry standard 1/4" and 1/2" measurement microphones. An adapter is included to facilitate the testing of 1/4" microphones. The G.R.A.S. RA0015 electrostatic actuator is recommended for frequency response testing of G.R.A.S. and other industry standard 1" microphones.

Electrostatic actuators are used to simulate condenser microphone pressure response. This is done by exerting an oscillating electrostatic force on the diaphragm of the microphone and measuring the response. This condition is obtained by applying an electrostatic force of sufficiently high polarization voltage (800 V) upon which a smaller alternating voltage is superimposed.

By applying such an oscillating electrostatic force, which sweeps over a range of frequencies from 100 Hz to 200 kHz, microphone pressure response can be tested. Corrections must also be added to determine the free-field microphone response for various angles of incidence, as well as response in a diffuse sound field for random angles of incidence.

G.R.A.S. 90CA

Microphone Calibration System

The G.R.A.S. 90CA Microphone Calibration System offers level and frequency response calibrations of IEC 61094 standardized 1", 1/2" and 1/4" measurement microphones, preamplifiers and microphone sets. Designed to reduce the risk of operator error, the 90CA comes with ready-to-use hardware and software, allowing for automatic calibrations in four easy steps, including:

Microphone Registration

The user can enter test condition data and microphone parameters. For G.R.A.S. microphones, a built-in database of calibration parameters is pre-programmed and can be expanded to include other manufacturers' models.

Level Calibration

Using the supplied pistonphone and insert-voltage preamplifier, open-circuit sensitivity is determined at 250 Hz, 114 dB.

Frequency Calibration

An electrostatic actuator determines microphone frequency response, with customizable range and steps.

Calibration Certificate

Complete calibration data is saved as a text file. The system auto-generates a calibration certificate as a PDF file, which is fully customizable and printable with logo, etc.



We Make Microphones

Since the company was established in 1994, we have been 100% dedicated to develop and manufacture high-quality measurement microphones and related acoustic equipment.

Tradition

We are located in Denmark and founded by the Danish acoustics pioneer, Gunnar Rasmussen who for more than 60 years has contributed to the world of sound and vibration with his unique ideas and designs. In 1956 Mr. Rasmussen designed the first reproducible 1" condenser measurement microphones. And the commercialization of these measurement microphones enabled quality measurements and instrumentation which could be acoustically calibrated and accredited.

Mr. Rasmussen's ingenuity and understanding of not yet spoken customer needs soon lead to the world's most popular and probably most copied acoustic sensor: The 1/2" measurement microphone. Then the 1/4" and 1/8" microphones followed with outstanding dynamic and high-

frequency capability that brought higher definition and transparency into impulse noise diagnostics. Many variants have been made available over the years; all based on Gunnar Rasmussen's original 1" pressure microphone design.

Innovation

At G.R.A.S., we and our customers benefit daily from Mr. Rasmussen's exceptional understanding of acoustics, physics, electronics and measurement needs. Not only in our R&D department but in the entire house we are proud to develop, produce and offer the broadest range of high-quality measurement microphones and accessories in the industry. And as a family company, now owned and managed by the two sons, Per Rasmussen and Peter Wulf-Andersen, we safeguard our heritage and knowledge to help create new opportunities with our customers. We work with everybody who has an interest in sound or noise within the fields of aerospace, automotive, audiology, consumer electronics, noise monitoring, building acoustics and telecommunications, metrology, education, consultancy, legislation and system integration.

Quality

All our microphones are solely produced in stainless steel and in a quality that allows for a 5 year warranty.

Should you by mistake damage the diaphragm on a G.R.A.S. microphone, our special technique enables repair at a very reasonable price. A fact often valued not only by the users but also by their purchase departments who are guaranteed a long term investment with equipment from G.R.A.S.

Partners

G.R.A.S. is represented worldwide in more than 40 countries by subsidiaries and partners. Whether you are searching for a multi-channel solution, a replacement microphone for your sound level meter or a customized sensor design, your local G.R.A.S. partner will in close corporation with us be able to help solve your measurement needs.

Please visit gras.dk for your local G.R.A.S. partner.