GRAS 47AC

1/2" CCP Infra-Sound Microphone Set

Freq range: 0.09 Hz to 20 kHz
Dyn range: 20 dB(A) to 148 dB
Sensitivity: 8 mV/Pa

The GRAS 47AC is a 1/2" CCP free-field microphone set optimized for infra-sound measurements down to 0.09 Hz.

GRAS Sound & Vibration
Skovlytoften 33, 2840 Holte, Denmark
www.grasacoustics.com

Introduction

The GRAS 47AC is a 1/2" CCP precision condenser microphone set for infra-sound measurements in open acoustic fields.

As a free-field microphone, 47AC is designed essentially to measure the sound pressure as it would appear if the microphone were not present, the sound field pointing towards the microphone.

At low frequencies, the disturbing effects of its presence in the sound field are minimal because the wavelengths are large compared to the size of the microphone.

At higher frequencies (>1 kHz), the effects of diffractions generally cause the measured sound pressure levels to increase with frequency. In a free-field microphone, the effects of diffraction are compensated for to provide a flat frequency response in a free-field for 0° incidence.

Design

The 47AC is especially designed for infra-sound measurements and can measure down to 0.09 Hz. To make this possible, it is furnished with an integrated low frequency adapter with a specially designed pressure equalization system and a dedicated preamplifier.

To make it possible for the microphone to measure sound with very long wavelengths, the pressure equalization system has a long settling time. It is therefore important that the 47AC is allowed sufficient time to settle in conditions with varying ambient pressure. How long depends on the specific circumstances, but about half a minute after the ambient pressure has stabilized is sufficient in most cases.

The preamplifier has TEDS for automatic sensor identification and reading of calibration data.

Typical applications and use

The low-frequency property combined with its high sensitivity and robust design make 47AC the obvious choice for infra-sound measurements - a fast growing discipline following the need for monitoring and reducing low-frequency noise from, for example, power and production plants and wind turbines.

With a lower limit below 0.1 Hz 47AC is also well suited for realistic measurements of supersonic booms which requires a microphone with a high bandwidth and the ability to capture steep low-frequency pressure variations.

Compatibility

To benefit from 47AC's low frequency capabilities, it is important that the analyzer input module, or sound level meter is designed to match 47AC. Many data acquisition/recording systems have a fixed or adjustable high-pass filter. In many cases this filter can have a cutoff frequency at 3 to 5 Hz, if not higher. Therefore, check if your data acquisition/recording system or conditioning power supply has a high pass filter (either hardwired or user configurable) and that it is compatible with the frequencies you are interested in.

We recommend that you consider using a GRAS 12AL power CCP module. It has a high pass filter at 0.07 Hz when used with the 47AC infrasound microphone set.

System verification

For sensitivity calibration at 250 Hz, we recommend using a pistonphone like GRAS 42AP Intelligent Pistonphone. A check at 1 kHz can be performed using a GRAS 42AG Multifunction Sound Calibrator.

Low-frequency calibration requires the use of a special low-frequency calibrator. We therefore

recommend that 47AC is send to GRAS for calibration.

Quality and warranty

All GRAS microphones are made of high-quality materials that will ensure life-long stability and robustness. The microphones are all assembled in verified clean-room environments by skilled and dedicated operators with many years of expertise in this field.

The microphone diaphragm, body, and improved protection grid are made of high-grade stainless steel, which makes the microphone resistant to physical damage, as well as corrosion caused by aggressive air or gasses.

This, combined with the reinforced gold-plated microphone terminal which guarantees a highly reliable connection, enables GRAS to offer 5 years warranty against defective materials and workmanship.

Service

If you accidentally damage the diaphragm on a GRAS microphone, we can - in most cases - replace it at a very reasonable cost and with a short turn-around time. This not only protects your investment, but also pleases your quality assurance department because you don't have to worry about new serial numbers, etc.

Calibration

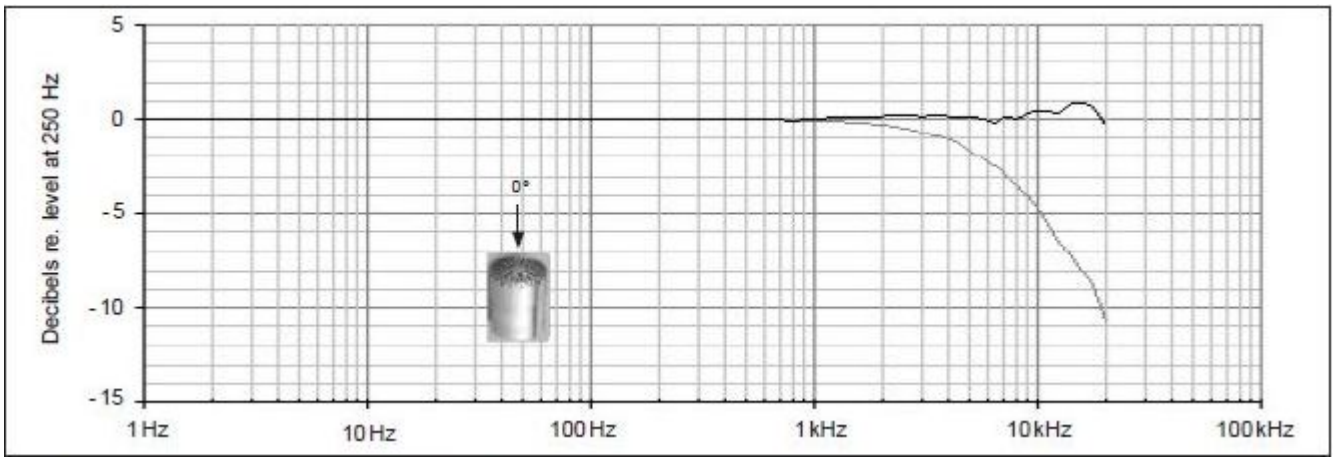
Before leaving the factory, all GRAS microphones are calibrated in a controlled laboratory environment using traceable calibration equipment.

Depending on the use, measurement environment, and internal quality control programs, we recommend recalibrating the microphone at least once a year.

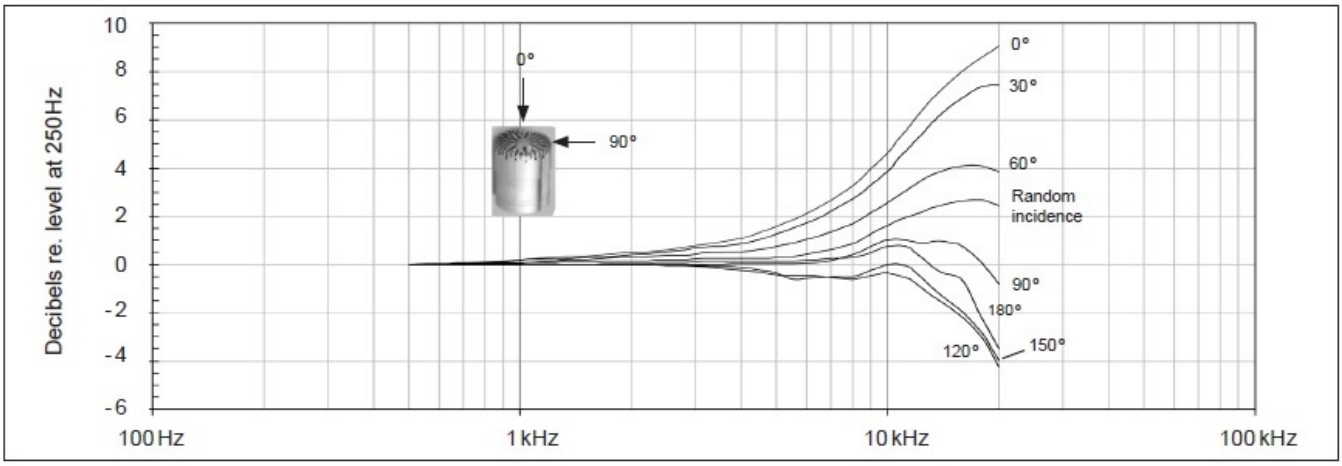
The 47AC comes with two calibration charts, a standard calibration certificate stating its sensitivity and frequency response above 250 Hz, and a chart documenting its frequency response below this frequency.

Specifications

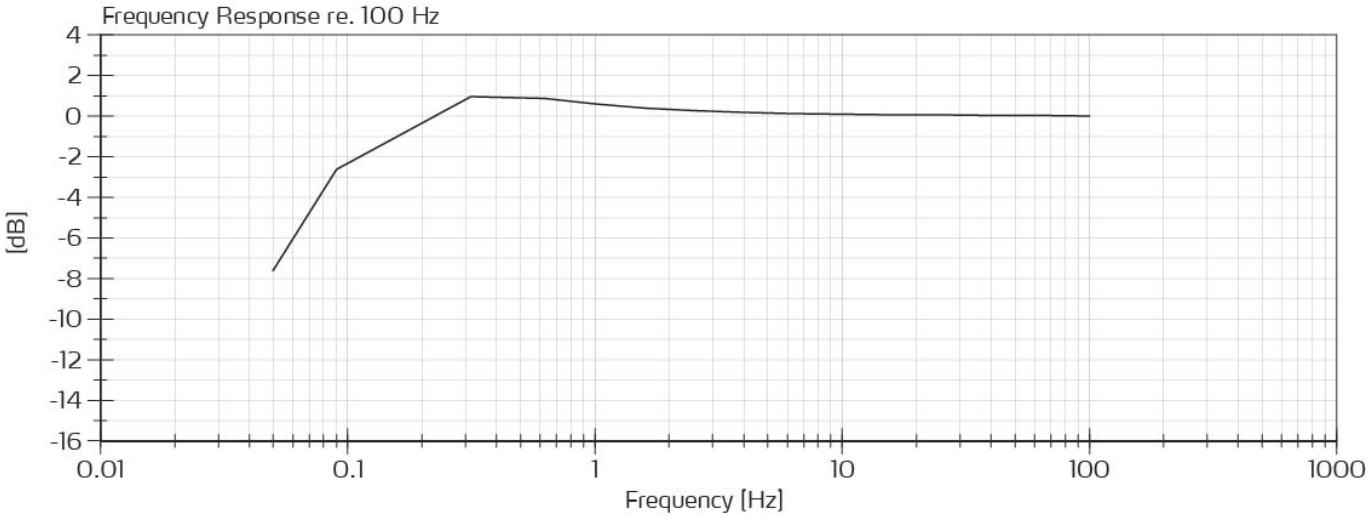
Polarization/Connection		0 V / CCP
Frequency range (±1 dB)	Hz	1 to 10 k
Frequency range (±3 dB)	Hz	0.09 to 20 k
Dynamic range lower limit (microphone thermal noise)	dB(A)	20
Dynamic range upper limit	dB	148
Set sensitivity @ 250 Hz (±2 dB)	mV/Pa	8
Output Voltage Swing, min. @ 24-28 V CCP voltage supply	Vp	8
Power supply min. to max.	mA	2 to 20
Power supply min. to max. (single/balanced)	V	N/A
DC bias voltage, typ.	V	12
Microphone venting		Rear
IEC 61094-4 Designation		WS2F
Temperature range, operation	°C / °F	-30 to 70 / -22 to 158
Temperature range, storage	°C / °F	-40 to 85 / -40 to 185
Temperature coefficient @250 Hz	dB/°C / dB/°F	-0.01 / -0.006
Static pressure coefficient @250 Hz	dB/kPa	-0.008
Humidity range non condensing	% RH	0 to 100
Humidity coefficient @250 Hz	dB/% RH	-0.001
Influence of axial vibration @1 m/s²	dB re 20 µPa	62
TEDS (IEEE 1451.4)		27 v. 1.0
Connector type		BNC
CE/RoHS compliant/WEEE registered		Yes/Yes/Yes
Weight	g / oz	33 / 1.164



Typical frequency response



Free-field corrections for different angles of incidence

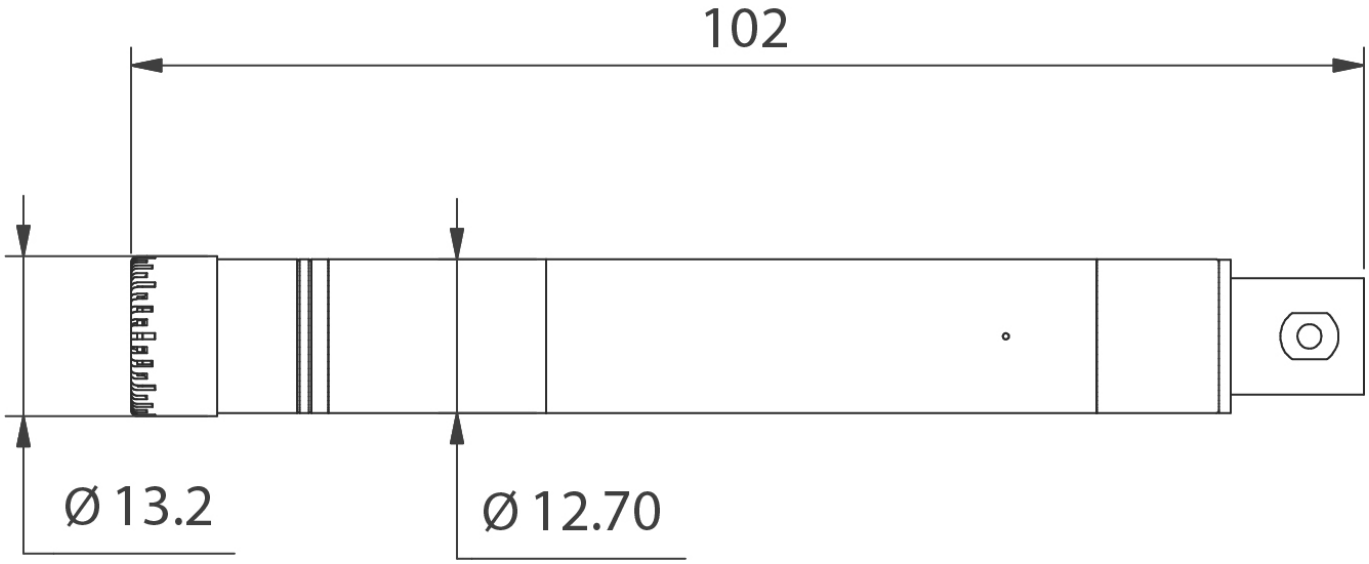


Typical frequency response below 250 Hz

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

Dimensions

Dimensions in mm



Optional items

GRAS AA0035	3 m BNC - BNC Cable
GRAS CAXXXX	Calibration
GRAS CAXXXX	Low-frequency calibration

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GRAS Worldwide

Subsidiaries and distributors in more than 40 countries

HEAD OFFICE, DENMARK
GRAS SOUND & VIBRATION
Skovlytoften 33
2840 Holte
Denmark
Tel: +45 4566 4046
www.GRASacoustics.com
gras@grasacoustics.com

USA
GRAS SOUND & VIBRATION
9290 SW Nimbus Avenue
Beaverton, OR 97008
Tel: 503-627-0832
Toll Free: 800-231-7350
www.GRASacoustics.com
sales-usa@grasacoustics.com

UK
GRAS SOUND & VIBRATION
Unit 115, Gibson House,
Ermine Business Park, Huntingdon,
Cambridgeshire, PE29 6XU
Tel: +44 (0)7762 584 202
www.GRASacoustics.com
sales-uk@grasacoustics.com

CHINA
GRAS SOUND & VIBRATION
Room 502, Building T1,
No.1398 Ali Center
Shenchang Road,
Minhang District,
Shanghai, China, 201107
Tel: +86 21 400-888-9826
www.GRASacoustics.cn
cnsales@grasacoustics.com

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 to industries where acoustic measuring accuracy and repeatability is of utmost importance in R&D, QA and production. This includes applications and solutions for customers within the fields of aerospace, automotive, audiology, and consumer electronics. GRAS microphones are designed to live up to the high quality, durability and accuracy that our customers have come to expect and trust.

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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