

GRAS 47HC

1/2" CCP Low-noise Microphone System



Freq range: 10 Hz to 20 kHz
Dyn range: 6.5 dB(A) to 100 dB SPL (20 Hz - 8 kHz)
6.5 dB(A) to 85 dB SPL (8 kHz - 20 kHz)
Sensitivity: 400 mV/Pa

The GRAS 47HC 1/2" Low-noise Microphone System measures sound pressure levels down to close to the threshold of human hearing. It is thus generally suitable for sound-power measurements on even very quiet products. Its very wide dynamic range permits measurements down to below 6.5 dB re. 20 Pa (in 1/3-octave bands).

Introduction

Low noise emission becomes increasingly important for all kinds of machines, equipment and consumer products, and quiet products are often preferred over more noisy ones. It therefore becomes increasingly important to develop quiet products, and for this measurements close to the threshold of human hearing are needed.

A standard 1/2" microphone with high sensitivity (50 mV) has a noise floor about 16 dB(A), and the useful measurement range therefore begins at about 19 dB(A). To measure below this level, a special low-noise system is needed.

The 47HC is a prepolarized low-noise microphone set which builds on GRAS' more than 20 years' of experience with state of the art low-noise measurement microphone systems. With this set, the performance previously reserved for externally polarized setups is now available for CCP powered systems.

With a sensitivity of 450 mV/pa and a noise floor at 6.5 dB(A) or lower, it opens up for measurement levels down to about 10 dB(A). Its upper dynamic limit is 100 dB below 8 kHz, 85dB from 8 kHz to 20 kHz.

The microphone set has the same form factor as standard GRAS 1/2" microphone sets, and therefore it can be used with standard mounting accessories.

The 47HC is delivered with Generation II TEDS. The calibration data is programmed into the built-in TEDS according to IEEE 1451.4 using UDID I27-0-0-0U. If your measurement platform supports Transducer Electronic Data Sheets you will be able to read and write data like properties and calibration data.

Generation II TEDS chip (DS2431) may require

updated system software.

Typical applications and use

- Measurements at very low sound pressure levels
- Sound-power measurements at low levels
- Measurements in quiet rooms and anechoic rooms
- Measurements on, for example, hard-disk drives, computer products, fans, electric cars, fluorescent lamps and other quiet products

Design

The 47HC comprises a special high-sensitive 1/2" free-field measurement microphone and an integrated 1/2" low-noise preamplifier. In combination, they connect to high-quality CCP input modules with BNC connector.

Preamplifier

The preamplifier is a special 1/2" amplifier with BNC connector optimized for low-noise. It provides amplification and has a built-in compensation filter that ensures linear free-field response up to the upper limit at 20 kHz.

Microphone

The 1/2" microphone is a pre-polarized free field microphone with a specially reduced inherent noise floor in order to achieve a large dynamic range and a wide frequency response. Its diaphragm is specially tuned for high sensitivity coupled with low internal noise.

Compatibility

The microphone set has the same form factor as a standard GRAS microphone set, and therefore it can be used with the standard mounting accessories available for GRAS standard microphone sets. It has the same dimensions as the 46AE, an advantage if it

shall be mounted in a GRAS hemisphere.

Calibration

For level calibration you need a 42AG Multifunction Sound Calibrator which can generate a signal of 94 dB re. 20 μ Pa.

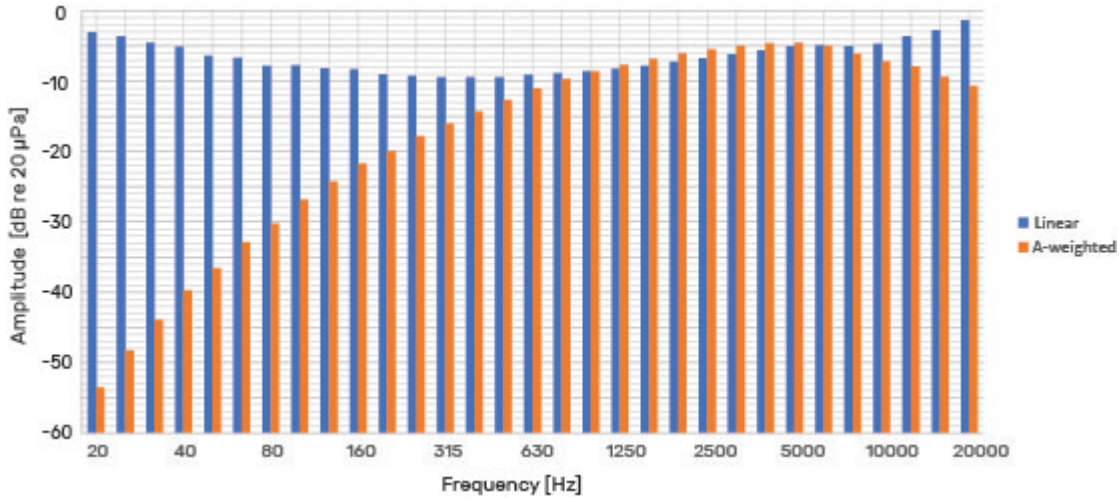
The level normally used for sound level calibration (114 dB) will overload the 47HC and therefore the lower level is needed.

For frequency calibration you must send the set for calibration at GRAS.

See the tab Ordering info.

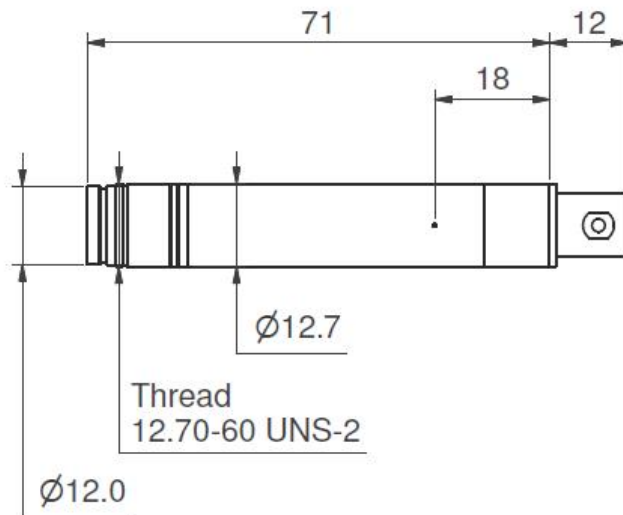
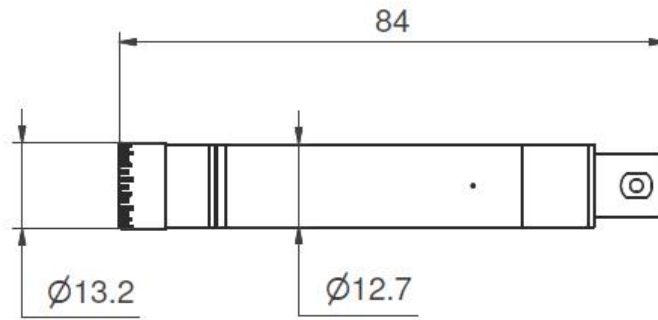
| | | |
|--|---|------------------------|
| Polarization/Connection | | 0 V / CCP |
| Frequency range (± 1 dB) | Hz | 12.5 to 10k |
| Frequency range (± 2 dB) | Hz | 10 to 16k |
| Frequency range (± 3 dB) | Hz | 6 to 20k |
| Dynamic range lower limit (microphone thermal noise) | dB(A) | 6.0 |
| Dynamic range upper limit | dB | 100 |
| Set sensitivity @ 250 Hz (± 2 dB) | mV/Pa | 400 |
| Polarization voltage | V | 0 V |
| Power supply (Constant Current Power) | mA | 4-20 |
| Microphone venting | | Rear |
| Output impedance | | 47 |
| Temperature range, operation | $^{\circ}\text{C} / ^{\circ}\text{F}$ | -10 to 60 / 14 to 140 |
| Temperature range, storage | $^{\circ}\text{C} / ^{\circ}\text{F}$ | -40 to 85 / -40 to 185 |
| Temperature coefficient @250 Hz | dB/ $^{\circ}\text{C}$ / dB/ $^{\circ}\text{F}$ | -0.01 / -0.006 |
| Static pressure coefficient @250 Hz | dB/kPa | -0.01 |
| Humidity range non condensing | % RH | 0 to 95 |
| Humidity coefficient @250 Hz | dB/% RH | 0,001 |
| Influence of axial vibration @1 m/s ² | dB re 20 μPa | 63 |
| Connector type | | BNC |
| CE/RoHS compliant/WEEE registered | | Yes / Yes / Yes |

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



Typical noise floor shown in 1/3-octave bands - linear and A-weighted

Dimensions in mm



Optional items

| | |
|-----------------------------|--|
| GRAS AA0035 | 3 m BNC - BNC Cable |
| GRAS AL0006 | Tripod |
| GRAS RA0093 | Adjustable, high quality, stainless steel tripod adapter |
| GRAS AM0069 | Windscreen for 1/2" Microphones |
| GRAS 12AQ | 2-Channel Universal Power Module with signal conditioning and PC interface |
| GRAS 12AX | 12AX 4-Channel CCP Power Module with Gain |
| GRAS 42AP | Intelligent Pistonphone, Class 0 |
| GRAS 42AA | Pistonphone, Class 1 |
| GRAS RA0090 | 94 dB Pistonphone Coupler |

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

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 315, RuiBo Center(T1)
Lane683, Shenhong Rd,
Minhang District,
Shanghai, China, 201107
Tel: +86 21 64203370
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 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

grasacoustics.com

GRAS
An Axiometrix Solutions Brand