# GRAS 40AG

1/2" Ext. Polarized Pressure Microphone





Freq range: 3.15 Hz to 20 kHz Dyn range: 20 dBA to 164 dB Sensitivity: 12.5 mV/Pa The 40AG is an IEC 61094 WS2P %" externally polarized pressure microphone with rear-venting. It is a high-precision condenser microphone made according to IEC 61094-4 requirements and is ideal for coupler measurements in both laboratory and production environments. It is extremely robust and reliable and can measure sound pressure levels up to 160 dB within 3.15 Hz to 20 kHz.



## Technology

### Introduction

The 40AG is an IEC 61094 WS2P ½" externally polarized pressure microphone with rear-venting. Read about the prepolarized equivalent [40A0]

It is a high-precision condenser microphone made according to IEC 61094-4 requirements and is ideal for coupler measurements in both laboratory and production environments. It is extremely robust and reliable and can measure sound pressure levels up to 160 dB within 3.15 Hz to 20 kHz.

40AG is individually factory-calibrated and delivered with a calibration chart stating its specific open-circuit sensitivity and pressure frequency response.

A front-vented version is available, 40AG-FV ½" Ext. pol. Pressure Microphone, Front Vented.

## Typical applications and use

The broad working range and reliability has made 40AG the preferred externally polarized microphone for coupler and ear simulator setups and is the natural supplement to or replacement of existing solutions. The 40AG is especially suited for audiometer calibration when using a sound level meter / analyzer with a 200 V polarization feature.

It is used for production line testing in coupler setups for test of hearing aids, earphones, headphones, and headsets.

The KEMAR Manikin can also be configured with 40AG for wide-band binaural sound quality recordings.

40AG can be used in

- RA0039 Ear Simulator according to IEC 60318-1
- RA0038 ½" 2cc Coupler according to IEC 60318-5
- KEMAR Manikin (Sound Quality recording)

40AG is included in

- 46AG ½" Pressure Set
- RA0045 Externally Polarized Ear Simulator according to IEC 60318-4
- RA0039 Ear Simulator according to IEC 60318-1
- 43AA Ear Simulator Kit according to IEC 60318-1
   2
- 43AB ½" 2cc Coupler Kit according to IEC 60318-5
- 43AC Ear Simulator Kit according to IEC 60318-4
- 43AD Ear Simulator Kit according to ITU-T Rec. P57 Type 1
- 43AE Ear Simulator Kit according to ITU-T Rec. P57 Type 3.2

Other coupler systems can be configured with 40AG and a GRAS LEMO preamplifier on request.

## Compatibility

The 40AG requires a standardized  $\chi''$  or  $\chi''$  LEMO preamplifier and an input module that supports this technology with a 7-pin LEMO connector.

## **System verification**

For daily verification and check of your measurement setup, we recommend using a calibrator like GRAS Sound Level Calibrator 42AG

For proper sensitivity calibration, we recommend using a pistonphone like GRAS Intelligent Pistonphone 42AP.

### **Calibration**

When leaving the factory, all GRAS microphones have been calibrated in a controlled laboratory environment using traceable calibration equipment. Depending on the use, measurement environment and internal quality control programs we recommend that the microphone is recalibrated at least once a year.

We offer two kinds of calibration as an optional after-sales service: GRAS Traceable Calibration and



## Technology

GRAS Accredited Calibration.

GRAS Traceable Calibration is a traceable calibration performed by trained personnel under controlled conditions according to established procedures and standards. This is identical to the rigorous calibration that all GRAS microphones are subjected to as an integral part of our quality assurance.

GRAS Accredited Calibration is performed by the GRAS Accredited Calibration Laboratory that has been accredited in accordance with ISO 17025 by DANAK, the Danish Accreditation Fund.

If you want a new microphone set delivered with an accredited calibration in stead of the default factory calibration, specify this when ordering.

Learn more at gras/calib.

## **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.

**Pressure Microphone** 

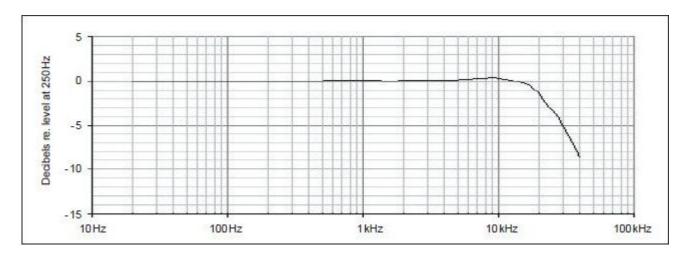


## Specifications

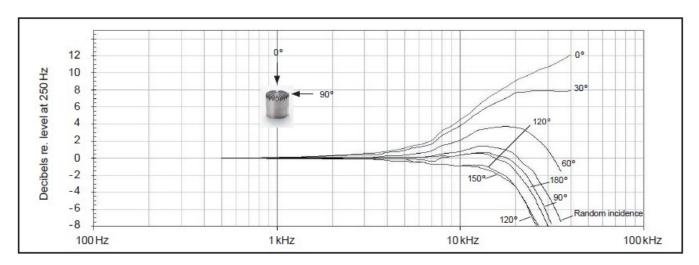
| Polarization/Connection   |               | 200 V / Traditional     |
|---|---------------|-------------------------|
| Frequency range (±1 dB)   | Hz            | 5 to 12.5 k             |
| Frequency range (±2 dB)   | Hz            | 3.15 to 20 k            |
| Dynamic range lower limit (microphone thermal noise)                                | dB(A)         | 20                      |
| Dynamic range lower limit with GRAS preamplifier                                    | dB(A)         | 25                      |
| Dynamic range upper limit   | dB            | 164                     |
| Dynamic range upper limit with GRAS preamplifier @ +28 V / ±14 V power supply       | dB            | 153                     |
| Dynamic range upper limit with GRAS preamplifier @ +120 V / $\pm 60$ V power supply | dB            | 164                     |
| Resonance frequency   | kHz           | 32                      |
| Microphone cartridge capacitance, typ.  | pF            | 20                      |
| Microphone venting  |               | Rear                    |
| Temperature range, operation  | °C / °F       | -40 to 150 / -40 to 302 |
| IEC 61094-4 Designation   |               | WS2P                    |
| Temperature range, storage  | °C / °F       | -40 to 85 / -40 to 185  |
| Temperature coefficient @250 Hz   | dB/°C / dB/°F | -0.01/-0.006            |
| Humidity range non condensing   | % RH          | 0 to 90                 |
| Static pressure coefficient @250 Hz   | dB/kPa        | -0.011                  |
| Humidity coefficient @250 Hz  | dB/% RH       | -0.001                  |
| Influence of axial vibration @1 m/s²  | dB re 20 μPa  | 66                      |
| CE/RoHS compliant/WEEE registered   |               | Yes / Yes, Yes          |
| Weight  | g / oz        | 7 / 0.247               |
| Open-circuit sensitivity @250 Hz (±1.5 dB)  | mV/Pa         | 12.5                    |
| Open-circuit sensitivity @250 Hz (±1.5 dB)  | db re 1 V/Pa  | -38                     |



## Specifications



Typical frequency response.



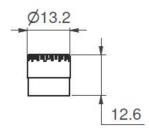
Free-field corrections for different angles of incidence

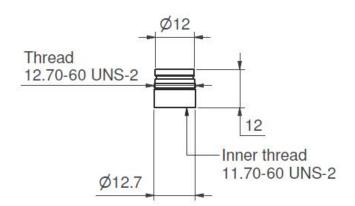
GRAS Sound & Vibration reserves the right to change specifications without notice.



## Dimensions

### Dimensions in mm







## Ordering info

| GRAS 40AG          | 1/2" Ext. Polarized Pressure Microphone. This is the "standard" rear vented version.     |
|--------------------|--|
| GRAS 40AG-FV       | 1/2" Ext. Polarized Pressure Microphone, Front Vented. This is the front vented version. |
| GRAS AF0008        | Adapter for ¼" preamplifier and ½" microphone  |
| GRAS GR0010        | Adapter for ¼" preamplifier and ½" microphone  |
| <u>GRAS RA0001</u> | Right-angled (90°) adapter for ½" microphone and ¼" preamplifier                         |
| GRAS RA0003        | Adapter for ¼" preamplifier and ½" microphone  |
| GRAS RA0016        | 20 dB Attenuator for externally polarized ½" microphones                                 |
| GRAS CA0001        | Traceable Calibration of Microphone  |
| GRAS CA2001        | Accredited Calibration of Microphone   |

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



## **GRAS** Worldwide

Subsidiaries and distributors in more than 40 countries

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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

GRAS

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