

Microphone Sets



GRAS Sound
& Vibration



MICROPHONE SETS

FOR ALL ACOUSTIC APPLICATIONS

Microphone sets

Some years ago, GRAS introduced microphone sets as a new approach to measurement microphones and measurement data safety. This concept was a reaction to our customers' wishes for easier microphone selection, simple system configuration, and reduction of measurement errors. Daily situations where you mix up externally polarized and prepolarized microphones and preamplifiers or use wrong calibration data in the system setup are time-consuming. Often these situations are undiscovered until a whole set of measurement data is analyzed and consequently discarded.

Preassembled sets

The sets of preassembled GRAS microphones and preamplifiers solve these problems and are combinations carefully selected to obtain the best possible properties and reliability, thus optimizing the workflow for the user and minimizing typical handling errors. The sets are assembled in a clean room to avoid contamination of the interface between the microphone and preamplifier and are sealed with a label. The label can be removed and the set dismantled, if desired by the user.

Easy selection

The measurement microphone sets have been combined so that they fulfill our users' typical measurement needs. Irrespective of your measurement system and application, you should be able to find a set that suits your needs. To make selection easy, we have added a table that shows the size of the standard measurement microphone set that matches your requirement for sound pressure levels and frequency ranges. Use this table to initially identify the input type you have and the sensor size based on your expected sound pressure levels and frequency range. Go to the centerfold and choose the appropriate properties for your specific application.

Plug and Play

The standard microphone sets can be connected directly to all professional measurement systems and are available for both CCP and 7-pin LEMO inputs. If your measurement platform supports intelligent transducers according to IEEE 1451.4 (TEDS), you can simply plug in the microphone sets and they will identify themselves with their specific properties, types and calibration data. A feature especially appreciated by multi-channel users.

Dynamic range of GRAS CCP and LEMO Standard Microphone Sets

■ CCP
■ LEMO



Frequency range of GRAS CCP and LEMO Standard Microphone Sets

■ CCP
■ LEMO



Cables

The CCP sets use high-quality coaxial cables, the LEMO sets use a special, flexible multi-core shielded cable. Some sets have the cable included while others have it as an accessory. It should be noted that longer cables will influence the upper frequency and dynamic ranges.

Calibration data

A GRAS microphone set is delivered as a unit with a calibration chart, including sensitivity values and frequency response curves for the complete set. The sensitivity value can, therefore, be used directly in your system setup.

Verification and annual calibration

For verification of the measurement chain, a sound source is required. GRAS supplies a series of piston-phones and sound calibrators for this purpose. Depending on the use (field or laboratory) and your internal quality control requirements, we recommend that the sets are re-calibrated at least every second year. Contact your local GRAS partner for factory and accredited calibration options.

Quality

All GRAS microphone sets are made from premium materials and assembled by skilled craftsmen. When our R&D team develops a measurement microphone, it must undergo the most demanding tests to prove that it can withstand our customers' daily test conditions. Using a series of Highly Accelerated Lifetime Tests (HALT), we ensure that our microphones live up to the high quality and precision that our customers have come to expect and trust. Our HALT tests actively accelerate the lifetime of a microphone by simulating the handling and use it is exposed to in real-life situations. By stress testing to the limits, we have been able to optimize the design for robustness and stability.

Warranty

GRAS offers a 5-year warranty on the microphone sets.

Service

If you by mistake should damage the diaphragm, integrated cable or connector, they can all be exchanged. This is also the case for the microphone capsule and preamplifier unit.

CCP MICROPHONE SETS

1/2" CCP STANDARD MICROPHONE SETS



1/2" free-field
GRAS 146AE

Frequency range 3.15 Hz - 20 kHz
Dynamic range 18 dB(A) - 133 dB
Sensitivity 50 mV/Pa



1/2" free-field
GRAS 46AE

Frequency range 3.15 Hz - 20 kHz
Dynamic range 17 dB(A) - 138 dB
Sensitivity 50 mV/Pa



1/2" free-field
GRAS 46AM

Frequency range 3.15 Hz - 31.5 kHz
Dynamic range 25 dB(A) - 149 dB
Sensitivity 14.5 mV/Pa



1/2" pressure
GRAS 46AD

Frequency range 3.15 Hz - 10 kHz
Dynamic range 18 dB(A) - 138 dB
Sensitivity 50 mV/Pa



1/2" pressure
GRAS 46AO

Frequency range 3.15 Hz - 20 kHz
Dynamic range 25 dB(A) - 150 dB
Sensitivity 12 mV/Pa



1/2" random
GRAS 46AQ

Frequency range 3.15 Hz - 12.5 kHz
Dynamic range 17 dB(A) - 138 dB
Sensitivity 50 mV/Pa

1/4" CCP STANDARD MICROPHONE SETS



1/4" free-field
GRAS 46BE

Frequency range 4 Hz - 80 kHz
Dynamic range 35 dB(A) - 160 dB
Sensitivity 3.6 mV/Pa



1/4" pressure
GRAS 46BL

Frequency range 4 Hz - 20 kHz
Dynamic range 25 dB(A) - 147 dB
Sensitivity 18 mV/Pa



1/4" pressure
GRAS 46BD

Frequency range 4 Hz - 70 kHz
Dynamic range 44 dB(A) - 166 dB
Sensitivity 1.45 mV/Pa



1/4" pressure
GRAS 46BG

Frequency range 3.15 Hz - 70 kHz
Dynamic range 60 dB(A) - 184 dB
Sensitivity 0.25 mV/Pa

1/8" CCP STANDARD MICROPHONE SETS



1/8" pressure
GRAS 46DD

Frequency range 6.5 Hz - 140 kHz*
Dynamic range 52 dB(A) - 174 dB
Sensitivity 0.8 mV/Pa



1/8" pressure
GRAS 46DE

Frequency range 6.5 Hz - 140 kHz*
Dynamic range 52 dB(A) - 174 dB
Sensitivity 0.8 mV/Pa



Probe
GRAS 40SC

Frequency range 2 Hz - 8 kHz
Dynamic range 40 dB(A) - 160 dB
Sensitivity 3 mV/Pa

RUGGED MICROPHONE SETS



1/2" free-field
GRAS 146AE

Frequency range 3.15 Hz - 20 kHz
Dynamic range 18 dB(A) - 133 dB
Sensitivity 50 mV/Pa



1/2" free-field
GRAS 147EB

Frequency range 3.15 Hz - 20 kHz***
Dynamic range 18 dB(A) - 133 dB
Sensitivity 50 mV/Pa



1/2" flush-mount
GRAS 147AX

Frequency range 3.15 Hz - 20 kHz
Dynamic range 19 dB(A) - 133 dB
Sensitivity 45 mV/Pa

LEMO MICROPHONE SETS

1/2" LEMO STANDARD MICROPHONE SETS



1/2" free-field
GRAS 46AF

Frequency range 3.15 Hz - 20 kHz
Dynamic range 17 dB(A) - 149 dB
Sensitivity 50 mV/Pa



1/2" free-field
GRAS 46AC

Frequency range 3.15 Hz - 40 kHz
Dynamic range 20 dB(A) - 164 dB
Sensitivity 12.5 mV/Pa



1/2" pressure
GRAS 46AG

Frequency range 3.15 Hz - 20 kHz
Dynamic range 25 dB(A) - 164 dB
Sensitivity 12 mV/Pa



1/2" pressure
GRAS 46AP

Frequency range 3.15 Hz - 10 kHz
Dynamic range 18 dB(A) - 149 dB
Sensitivity 50 mV/Pa



1/2" random
GRAS 46AR

Frequency range 3.15 Hz - 16 kHz*
Dynamic range 19 dB(A) - 149 dB
Sensitivity 50 mV/Pa

1/4" LEMO STANDARD MICROPHONE SETS



1/4" free-field
GRAS 46BF-1

Frequency range 4 Hz - 100 kHz
Dynamic range 35 dB(A) - 172 dB
Sensitivity 3.6 mV/Pa



1/4" pressure
GRAS 46BP-1

Frequency range 4 Hz - 70 kHz
Dynamic range 39 dB(A) - 172 dB
Sensitivity 1.5 mV/Pa



1/4" pressure
GRAS 46BH-1

Frequency range 10 Hz - 20 kHz
Dynamic range 54 dB(A) - 193 dB
Sensitivity 0.4 mV/Pa

1/8" LEMO STD. MIC. SET



1/8" pressure
GRAS 46DP-1

Frequency range 6.5 Hz - 140 kHz
Dynamic range 52 dB(A) - 178 dB
Sensitivity 0.9 mV/Pa

LEMO PROBE MIC. SET



Probe
GRAS 40SA

Frequency range 2 Hz - 8 kHz
Dynamic range 40 dB(A) - 166 dB
Sensitivity 3 mV/Pa

LEMO LOW-FREQUENCY SET



1/2" free-field
GRAS 46AN

Frequency range 0.5 Hz - 20 kHz*
Dynamic range 17 dB(A) - 149 dB
Sensitivity 50 mV/Pa

LEMO LOW-NOISE MICROPHONE SYSTEMS



**1" free-field/
pressure**
GRAS 40HF

Frequency range 6 Hz - 12.5 kHz*
Dynamic range -2 dB(A) - 110 dB peak
Sensitivity 1100 mV/Pa



**1" free-field/
pressure**
GRAS 40HL

Frequency range 6 Hz - 20 kHz*
Dynamic range 6.5 dB(A) - 110 dB peak
Sensitivity 850 mV/Pa

LEMO INTENSITY PROBES



Intensity Probe
GRAS 50AI/AI-B, -D, -C

Phase response IEC 61043 Class 1
Dynamic range 25 dB(A) to 152 dB
Sensitivity 25 mV/Pa



**1/2" free-field/
pressure**
GRAS 40HH

Frequency range 6 Hz - 20 kHz*
Dynamic range 6.5 dB(A) - 113 dB peak
Sensitivity 800 mV/Pa



**1/2" free-field/
pressure**
GRAS 40HT

Frequency range 6 Hz - 20 kHz*
Dynamic range 6.5 dB(A) - 113 dB peak
Sensitivity 800 mV/Pa



3-D Probe
GRAS 50VI

Phase response IEC 61043 Class 1
Dynamic range 25 dB(A) to 152 dB
Sensitivity 25 mV/Pa

CCP MICROPHONE SETS

CCP LOW-PROFILE MICROPHONE SETS



1/2" flush-mount
GRAS 147AX

Frequency range 3.15 Hz - 20 kHz
Dynamic range 19 dB(A) - 133 dB
Sensitivity 45 mV/Pa



1/2" flush-mount
GRAS 47AX

Frequency range 3.15 Hz - 20 kHz
Dynamic range 22 dB(A) - 150 dB
Sensitivity 12.5 mV/Pa



1/4" flush-mount
GRAS 47BX

Frequency range 4 Hz - 70 kHz
Dynamic range 44 dB(A) - 166 dB
Sensitivity 1.6 mV/Pa



1/8" flush-mount
GRAS 47DX

Frequency range 10 Hz - 100 kHz*
Dynamic range 52 dB(A) - 174 dB
Sensitivity 0.9 mV/Pa



1/4" surface
GRAS 40LA/40LS

Frequency range 5 Hz - 70kHz*
Dynamic range 56/46 dB(A) - 178/167 dB
Sensitivity 0.5/1.8 mV/Pa



1/4" surface
GRAS 40PS-1

Frequency range 10 Hz - 20 kHz**
Dynamic range 27 dB(A) - 145 dB
Sensitivity 15 mV/Pa

CCP ARRAY AND QC MICROPHONE SETS



Free-field Array
GRAS 40PH/40PL

Frequency range 10 Hz - 50 kHz*
Dynamic range 32 dB(A) - 135/150 dB
Sensitivity 50/10 mV/Pa



Free-field QC
GRAS 40PP

Frequency range 10 Hz - 20kHz
Dynamic range 32 dB(A) - 128 dB
Sensitivity 50 mV/Pa



Free-field QC
GRAS 40PK

Frequency range 10 Hz - 20 kHz*
Dynamic range 26 dB(A) - 145 dB
Sensitivity 18 mV/Pa

CCP 1/2" LOW-NOISE MIC. SET



Free-field
GRAS 47HC

Frequency range 6 Hz - 20 kHz*
Dynamic range 6.5 dB(A) - 100 dB
Sensitivity 450 mV/Pa



Free-field
GRAS 46AZ

Frequency range 0.5 Hz - 20 kHz*
Dynamic range 17 dB(A) - 138 dB
Sensitivity 50 mV/Pa



Free-field
GRAS 47AC

Frequency range 0.09 Hz - 20 kHz*
Dynamic range 20 dB(A) - 148 dB
Sensitivity 8 mV/Pa

CCP INTENSITY PROBES



Intensity Probe
GRAS 50GI/50GI-R

Phase response IEC 61043 Class 1
Dynamic range 27 dB(A) - 163 dB
Sensitivity 12.5 mV/Pa



Intensity Probe
GRAS 50GI-P/50GI-RP

Phase response IEC 61043 Class 1
Dynamic range 27 dB(A) to 163 dB
Sensitivity 12.5 mV/Pa



3-D Probe Head
GRAS 60LK

Phase response IEC 61043 Class 2
Dynamic range 33 dB(A) to 150 dB
Sensitivity 6.5 mV/Pa

* ± 3 dB / ** +1, - 6 dB / *** When corrected for the influence of the 1" grid / All others ± 2 dB

ACCESSORIES

CALIBRATION



Pistonphone GRAS 42AP

Sound Pressure Level 114 dB
Frequency 250/251.2 Hz
Adapters included 1", 1/2", 1/4" and 1/8"

CABLES



CCP cables

3 m BNC-BNC AA0035
BNC-BNC, custom length AA0039-CL
3 m Microdot-BNC AA0070
Microdot-BNC, custom length AA0073-CL

WIND PROTECTION



Spherical windscreens

For 1" microphone AM0363
For 1/2" microphone AM0069
For 1/4" microphone AM0071
For array microphone AM0364



Sound Calibrator GRAS 42AG

Sound Pressure Level 94 dB/114 dB
Frequency 250/1000 Hz
Adapters included 1", 1/2", 1/4" and 1/8"



LEMO cables

3 m LEMO-LEMO AA0008
10 m LEMO-LEMO AA0009
LEMO-LEMO, custom length AA0020-CL



Windscreen for 147EB

Windscreen, 1 pcs AM0387-1
Windscreen, 20 pcs AM0387-4

RANDOM INCIDENCE CORRECTOR



Random incidence correctors

For 1/2" free-field microphones RA0122
For 146AE free-field microphones RA0357

ACCESSORIES FOR MOUNTING



Tripods AL0004/AL0006

Small lightweight tripod AL0004
Microphone tripod AL0006



Mounting disc for 147AX RA0392

Pack of mounting discs, 1 pcs RA0392-1
Pack of mounting discs, 10 pcs RA0392-10



GoPro Adapter RA0504

For connecting 1/2" microphone set to the whole range of GoPro mounting gear

TRIPOD ADAPTERS



Adjustable adapters STAINLESS STEEL

1/2" microphone, 5-click RA0093
1/4" microphone, 5-click RA0096
Array microphone, 3-click RA0094



Fixed adapters STAINLESS STEEL

1/2" microphone holder AL0012
1/4" microphone holder AL0013



Fixed adapters POM

1/2" microphone holder AL0008
7 mm microphone holder AL0028
1/4" microphone holder AL0029
1/8" microphone holder AL0035

We Make Microphones

GRAS is a worldwide leader in the sound and vibration industry. We develop and manufacture state-of-the-art measurement microphones and related equipment to industries where acoustic measuring accuracy and repeatability is of utmost importance. This includes applications and solutions for customers within the fields of aerospace, automotive, audiology, consumer electronics, and other high-demanding industries.

Innovation

As a family owned company, we safeguard our heritage by constantly striving to push the boundaries of what is possible and help our customers improve their products. This is why we have the industry's most advanced microphones – a broad range of high-quality microphones for general acoustic applications complemented by an even broader range of highly specialized microphones and test solutions developed and fine-tuned to match specific challenges.

This is a reflection of our unique willingness to help solve our customers' measurement needs and provide solutions for tomorrow. Listening to our customers is at the core of who we are.

Quality

Our measurement microphones are designed to support critical areas in our customers' R&D, QA and production line testing. Using Highly Accelerated Lifetime Tests (HALT), we ensure that our microphones perform optimally in real-life situations and retain the long-term stability that is crucial for trustworthy measurement results. All our microphones are made in Denmark from stainless steel and in a quality that allows for a 5-year warranty.

Unique Repair Service

Should you by mistake damage the diaphragm on a GRAS microphone, our special technique enables repair at a very reasonable price ensuring a very low cost of ownership.

Calibration Services

Depending on the use, measurement environment and internal quality control programs, we recommend that microphones are calibrated at a dedicated calibration laboratory at least every second year. We endorse our Accredited Calibration Laboratory in Denmark or the GRAS Microphone Calibration Centers located in Asia, Europe and North America.

Partners

GRAS is located in Denmark and represented worldwide in more than 40 countries. Also, we are the preferred supplier of acoustic sensors to a long list of measurement solution providers. Whether you are searching for a multi-channel solution, a replacement microphone or a customized design, your local GRAS partner will in close cooperation with us be able to help solve your measurement needs.

Please visit gras.dk to find your local GRAS partner.

Tradition

We were founded in 1994 by 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 microphone. Mr. Rasmussen's ingenuity soon led to the world's most popular and probably most copied acoustic sensor: The ½" measurement microphone. Then the ¼" and ⅛" microphones followed with outstanding dynamic and high-frequency capabilities that made high-definition diagnostics of impulse noise possible. Many variants have been made available over the years, all based on Gunnar Rasmussen's original 1" pressure microphone design.

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