

Sound-intensity Microphone Pairs Types 40AI and 40AK

Product Data and Specifications

Typical applications

- *Sound-intensity measurements*
- *Sound-power measurements*
- *Sound-source location*
- *IEC 61043 Standard instrumentation*

The Sound-intensity Microphone Pairs Types 40AI and 40AK (Fig. 1) are matched pairs of free-field microphones with extremely well-controlled phase characteristics for use in Sound Intensity Probes. The Sound-intensity Microphone Pair Type 40AI consists of two phase-matched, ½-inch externally-polarized condenser microphones. The Sound-intensity Microphone Pair Type 40AK is similar but also includes adapters for G.R.A.S. ¼-inch Preamplifiers Type 26AA and solid spacers for 12 mm, 25 mm, 50 mm and 100 mm intensity-probe configurations.

These intensity microphones are part of G.R.A.S.'s full range of condenser microphones. They are a recent generation of precision measurement microphones with improved performance and long term stability. Their design is based on more than 40 years of experience and utilizes the advantages of new high-tech materials and machining techniques. They comply with the requirements of the international standard IEC 1094 *Measurement Microphones, Part 4: Specifications for working standard microphones* and their mounting threads (11.7 mm 60 - UNS-2) are compatible with all the usual available makes of measurement-microphone preamplifiers.

The most important feature of a sound-intensity probe is to be able to measure the real part of a complex sound intensity in highly reactive sound fields as well as in sound fields with a high level of background noise. This ability depends largely on the phase responses of the pair of intensity microphones and, for high-quality pairs, the difference in

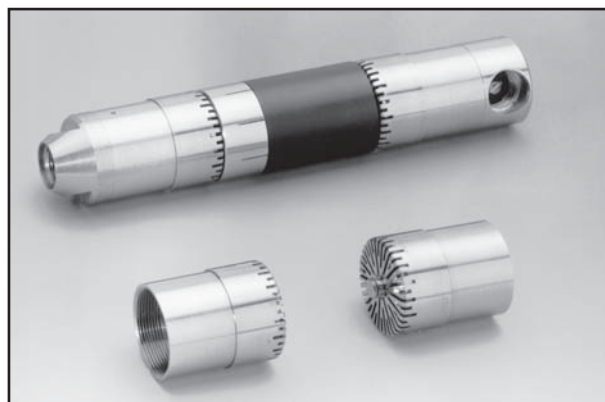


Fig. 1 *Intensity-microphone Pair Type 40AK with adapters and a spacer. Below:*

Intensity-microphone Pair Type 40AI phase responses must be extremely small. The pair of microphones in the Type 40AI comply with the phase requirements for a Class 1 Sound Intensity Probe in accordance with international IEC 61043, *Electroacoustics - Instruments for the Measurement of Sound Intensity - Measurements with Pairs of Pressure Sensing Microphones, 1993*.

These microphones have a uniquely-designed pressure equalization system that ensures a well-defined lower limiting frequency and an extremely low sensitivity to sound pressure at the pressure-equalization channel. This results in precise phase characteristics and allows the microphones to be phase calibrated in a single port calibrator such as the G.R.A.S. Sound-intensity Calibrator Type 51AB. The phase difference between the two microphones in a Type 40AI pair is better than 0.05° from 20 Hz to 250 Hz and better than $(f/5000)^\circ$ Hz at frequencies above 250 Hz, where f is the frequency in Hz. This has been obtained while still maintaining the high sensitivity of each microphone.

The Type 40AK is included in the G.R.A.S. Intensity Probe Type 50AI (Fig. 2), together with Preamplifiers Type 26AA, a remote control handle and an adjustable swivel-head mount for microphones.

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The Intensity Probe Type 50AI is available in various versions for connecting directly to various general purpose frequency analyzers as well as special sound intensity analyzers (see separate data sheet).

Non-corrosive, stainless materials are used in manufacturing these microphones to enable them to withstand rough handling and corrosive environments.

All G.R.A.S. microphones are guaranteed for 5 years and are individually checked and calibrated before leaving the factory. An individual calibration chart is supplied with each microphone.

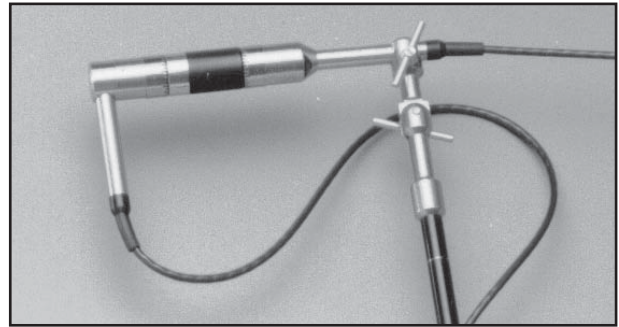


Fig. 2 Sound-intensity Microphone Pair with 25 mm spacer mounted on a G.R.A.S. Intensity Probe Type 50AI

Specifications

Open-circuit sensitivity:	25 mV/Pa \pm 1.5 dB	Intensity-probe configuration specifications	Sound Intensity Microphone Pair Type 40AI fulfils the phase requirements of a Class 1 Sound Intensity Probe in accordance with IEC International Standard 61043.
Polarization voltage:	200 V	Difference in phase response:	From 50 Hz to 250 Hz. <0.05° From 250 Hz to 6.3 kHz <(f/5000)°
Free-field frequency response (as a pair in a probe):	According to IEC 61043 1993 Class 1 and IEC 60651 Type 1 from 20 Hz to 10 kHz	Difference in amplitude response:	(normalised at 250 Hz)
1 Hz - 16 kHz	\pm 2.0 dB	From 20 Hz to 1 kHz. <0.2 dB	From 20 Hz to 5 kHz. <0.4 dB
1 Hz - 12.5 kHz.	\pm 1.0 dB	Difference in sensitivity at 250 Hz:	<1 dB
Resonant frequency:	12 kHz	Difference in polarized capacity:	<0.6 pF
Lower-limiting frequency, -3 dB:	0.2 Hz	Dimensions:	Length: 16.6 mm Diameter: 13.2 mm
Polarized cartridge capacitance at 250Hz:	23 pF	Preamplifier mounting thread:	11.7 mm - 60 UNS
Inherent cartridge noise:	<20 dBA re. 20 μ Pa	Weight:	6 g
Upper limit of dynamic range:	160 dB re. 20 μ Pa (<3% THD at 100 Hz)	Accessories included with Type 40AK:	Solid spacers for microphone separation: 12 mm, 25 mm, 50 mm and 100 mm
Temperature coefficient at 250Hz:	From -10 °C to +50 °C -0.002 dB/°C	Adapters, 1/2-inch to 1/4-inch:	Straight RA0003 Right angled (2) RA0001
Ambient pressure coefficient at 250Hz:	-0.0007 dB/hPa		
Humidity coefficient:	<0.1 dB/100% RH		
Influence of axial vibrations, 1 m/s²:	62 dB re. 20 μ Pa		
Influence of magnetic fields:	34 dB re. 20 μ Pa at 50 Hz, 80 A/m		

G.R.A.S. Sound & Vibration reserves the right to change specifications and accessories without notice

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