

# GRAS 45BD

AutoKEMAR Automotive Head and Torso Simulator



The GRAS 45BD AutoKEMAR is a specialized version of the renowned GRAS KEMAR, designed specifically for automotive acoustic testing. With its seat-mount system compatible with ISOFIX, the AutoKEMAR can be securely positioned in a car seat, ensuring precise and repeatable in-car measurements. The fixture's flexible design allows for comprehensive adjustability, including neck rotation, height, seat distance, forward and backward tilt, and viewing angle, providing true-to-life positioning and measurement versatility.

The AutoKEMAR is ideal for realistic in-car acoustic measurements, supporting a wide range of research and testing scenarios. It is user-reconfigurable, allowing for upgrades and replacements of ear simulators, microphones, and pinnae to suit different applications. An optional mouth simulator is available for speech-related testing, making AutoKEMAR a complete and adaptable solution for automotive acoustic evaluation. The system is offered in multiple pre-configured versions, ready to meet diverse testing needs right out of the box.

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## Introduction

Today's drivers expect more than performance, they demand a quiet, refined ride and an immersive audio experience. Whether powered by a traditional combustion engine or an electric drivetrain, in-cabin acoustic quality has become a defining factor in modern automotive design.

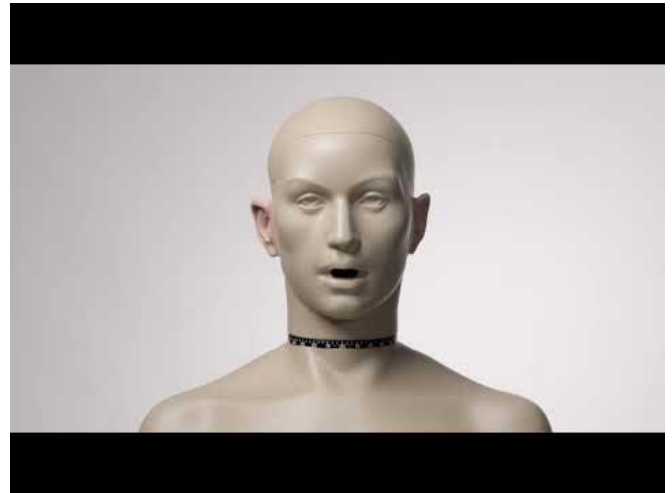
From benchmarking and tuning premium sound systems to sound quality testing, or minimizing unwanted noise and optimizing NVH (Noise, Vibration, and Harshness) performance, achieving excellence requires precise, repeatable, and realistic acoustic measurements.

AutoKEMAR's human-like acoustic properties allow engineers to perform accurate in-cabin measurements that closely replicate how sound behaves around a real occupant. The result is data you can trust, enabling better sound system design, more effective noise control, and a superior driving experience.

## Key Features

- Widest and most flexible positioning capabilities and motion range in the market.
- Available in multiple configurations.
- User reconfigurable: One unit -> Multiple applications.
- Multiple types of microphones, ear simulators and pinnae available.
- Accurate positioning, & Precision: Ensures consistent and repeatable measurements.
- Human-Like Acoustics: Mimics human head and torso for accurate sound simulation.
- Mouth simulator option available (can be retrofitted).
- Low-noise version available (11.5 dBA).
- Easy-access cable connector panel.
- ISOFIX-compatible for secure mounting.
- Lashing Strap secure mounting system for non-ISOFIX compatible car seats.

- Rattle free operation (Static, Dyno, On-road Tests).
- TEDS compatible.
- Equalization curves available: Free-field, Diffuse-field and Direction Independent.



## Typical Applications and Use

### Automotive in-cabin acoustics:

- Audio system performance & tuning
- Sound Quality & Sound Design
- Infotainment and DSP testing
- Speech intelligibility and voice quality
- Hands-free communication
- In-cabin NVH
- Wind tunnel measurements

### Other:

- Vehicles Exterior Sound / Noise
- eVTOL, Trains, Airplane cabins, etc.
- Any applications that will benefit from HATS (Consumer electronics: headphones, headsets, smart speakers. Hearing aids testing)



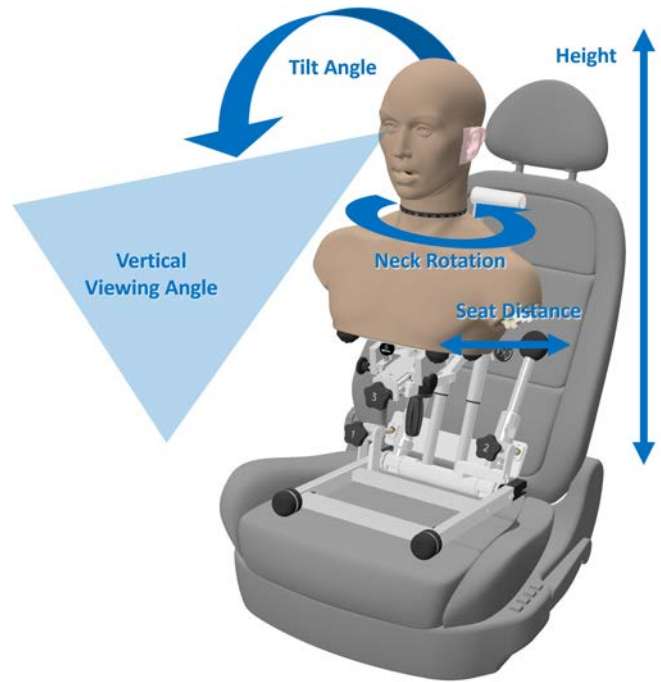


## Wide range of movement

Thanks to its ingenious seat-mount design, the GRAS 45BD AutoKEMAR offers the widest and most flexible range of motion available on the market.

This advanced fixture allows precise head and torso movement across all typical seating and driving positions, and even more extreme or unconventional setups, such as those representing very short or tall occupants, or relaxed resting positions.

By accommodating this broad range of realistic body postures, AutoKEMAR enables comprehensive and highly representative in-cabin acoustic testing, ensuring that every relevant listening position can be evaluated to take vehicle acoustics to the next level.



AutoKEMAR allows for multiple degrees of manual movement:

- Neck Rotation
- Height
- Seat Distance
- Tilt Angle Frontwards and Backwards
- Vertical Viewing Angle

## User-Reconfigurable: One AutoKEMAR - Multiple applications

Built on the same proven platform as the original GRAS KEMAR, the AutoKEMAR is designed for easy reconfiguration and maximum versatility.

Thanks to its snap-fit system, users can quickly remove and replace ear simulators, microphones, and pinnae, making it simple to adapt the fixture to different test setups or measurement needs. Multiple pinna types are available to match a variety of acoustic conditions.



This flexibility allows different teams to use the same AutoKEMAR for a wide range of applications, from sound-quality benchmarking and voice-quality evaluation to telecommunications testing inside the vehicle.

Each AutoKEMAR can be upgraded or reconfigured in just minutes using readily available spare parts, ensuring that your investment stays future-proof and adaptable to evolving automotive acoustics needs.



## ISOFIX Compatibility

The GRAS 45BD AutoKEMAR features a seat-mount system fully compatible with ISOFIX, allowing it to be securely fastened to a car seat for stable and repeatable in-cabin measurements. When mounted using ISOFIX, AutoKEMAR achieves maximum stability and precision, ensuring the widest possible range of movement while maintaining a firm, vibration-free position against the seat.

## No ISOFIX? No Problem

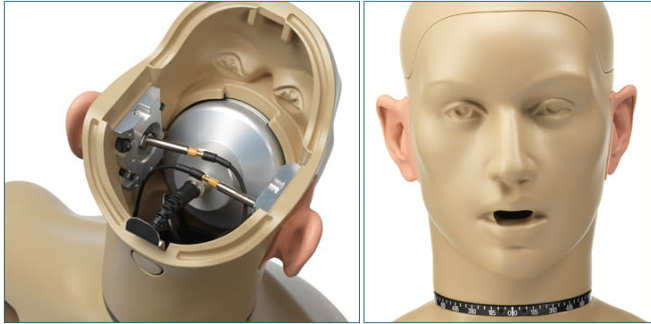
For vehicles or test setups without integrated ISOFIX anchor points, standard or custom ISOFIX adapters can be used to ensure a secure installation. In addition, every AutoKEMAR includes telescopic arms and a ratchet lashing strap system, allowing the Seat Mount to be firmly secured even when ISOFIX is not available.



## Mouth Simulator Option

The GRAS 45BD AutoKEMAR can be equipped with an optional mouth simulator, enabling realistic speech and voice testing inside the vehicle cabin. The mouth simulator acts as an acoustic sound source located inside the head, emitting audio signals through AutoKEMAR's mouth opening.





When equipped with a mouth simulator, the AutoKEMAR is a comprehensive solution for in-car microphone testing, speech intelligibility measurements, and evaluation of voice-control and hands-free communication systems.

It can be ordered with a mouth simulator or upgraded later through a retrofit option.

## Rattle free design

Every component of the GRAS 45BD AutoKEMAR, from the head and torso to the seat-mount assembly, is engineered for rattle-free performance.

This robust design ensures stable and noise-free operation, even in demanding test environments. As a result, AutoKEMAR is suitable not only for static in-cabin measurements, but also for tests conducted on dynamometers and even light on-road evaluations when secured with the ISOFIX mount or the Ratchet Lashing Strap system.

With its vibration-resistant construction, AutoKEMAR delivers consistent, high-fidelity acoustic data under real-world testing conditions.

## Compatibility

The GRAS 45BD AutoKEMAR is available in multiple configurations, featuring various combinations of microphones, pinnae, ear simulators, and mouth simulators to meet specific testing needs.

The acoustic signals captured by AutoKEMAR's two

“ears” are output as analog voltage signals proportional to the measured sound pressure. The microphones and ear simulators require a CCP (Constant Current Power) supply, also known as IEPE, ICP, or CCLD, and AutoKEMAR is fully compatible with all these standards.

If your data acquisition (DAQ) system does not provide a CCP supply, an external CCP power module can be used. Alternatively, AutoKEMAR's internal microphones can operate from a +48V Phantom Power supply when paired with an adapter such as the GRAS AG0003.

For setups including a mouth simulator, AutoKEMAR requires an analog signal from an external signal generator. The mouth simulator can be used in either passive mode (driven externally) or active mode (with a built-in amplifier).

## Quality & Warranty

The GRAS 45BD AutoKEMAR is built from premium components sourced from the GRAS standard portfolio, all manufactured with high-quality materials and precision-engineered parts to ensure long-term stability, durability, and performance.

Every unit undergoes rigorous quality control to meet GRAS's exacting standards for reliability and repeatability. This commitment to excellence allows us to offer a two-year warranty covering defects in materials and workmanship.

### Exceptions:

- Microphones supplied with AutoKEMAR are covered by a five-year warranty.
- Cables carry a six-month warranty.



| Part no                                    |                | 45BD-01                | 45BD-02                         | 45BD-07                       | 45BD-09                | 45BD-10                         | 45BD-15                       |
|--|----------------|------------------------|---------------------------------|-------------------------------|------------------------|---------------------------------|-------------------------------|
| <b>Configuration</b>                       | -              | <b>Sound Quality</b>   | <b>Sound Quality, Low Noise</b> | <b>Hi-Freq Ear Simulators</b> | <b>Sound Quality</b>   | <b>Sound Quality, Low Noise</b> | <b>Hi-Freq Ear Simulators</b> |
| <b>Mouth Simulator</b>                     | -              |                        | No                              |                               |                        | Yes                             |                               |
| <b>Output Channels (Ears)</b>              | -              |                        |                                 | 2                             |                        |                                 |                               |
| <b>Ear Simulators</b>                      | -              | No                     |                                 | RA0402 (69C-C-8 kit)          | No                     |                                 | RA0402 (69C-C-8 kit)          |
| <b>Microphone Type</b>                     | -              | 40AO (46AO-S2 kit)     | 40CH (46CH kit)                 | 40AO (inside RA0402)          | 40AO (46AO-S2 kit)     | 40CH (46CH kit)                 | 40AO (inside RA0402)          |
| <b>Pinnae Type</b>                         | -              | KB0090/1 Sound Quality | KB0090/1 Sound Quality          | KB5000/1 Anthropometric       | KB0090/1 Sound Quality | KB0090/1 Sound Quality          | KB5000/1 Anthropometric       |
| <b>Ear Canal</b>                           | -              | No                     |                                 | Yes                           |                        | No                              | Yes                           |
| <b>Connector Type</b>                      | -              |                        |                                 | BNC                           |                        |                                 |                               |
| <b>Set Sensitivity @ 250 Hz (±2 dB)</b>    | mV/Pa          | 12.5                   | 70                              | 12.5                          | 12.5                   | 70                              | 12.5                          |
| <b>Set Sensitivity @ 250 Hz (±2 dB)</b>    | dB (ref 1V/Pa) | -38                    | -23                             | -38                           | -38                    | -23                             | -38                           |
| <b>Dynamic Range Lower Limit</b>           | dB(A)          | 25                     | 11,5                            | 25                            | 25                     | 11,5                            | 25                            |
| <b>Dynamic Range Upper Limit - Max SPL</b> | dB             | 150                    | 113                             | 150                           | 150                    | 113                             | 150                           |
| <b>Temperature Range, operation</b>        | °C/°F          | -30 to 60 / -22 to 140 |                                 |                               |                        |                                 |                               |
| <b>Temperature Range, storage</b>          | °C/°F          | -40 to 65 / -40 to 149 |                                 |                               |                        |                                 |                               |
| <b>Humidity Range, noncondensing</b>       | %RH            | 0 to 95                |                                 |                               |                        |                                 |                               |

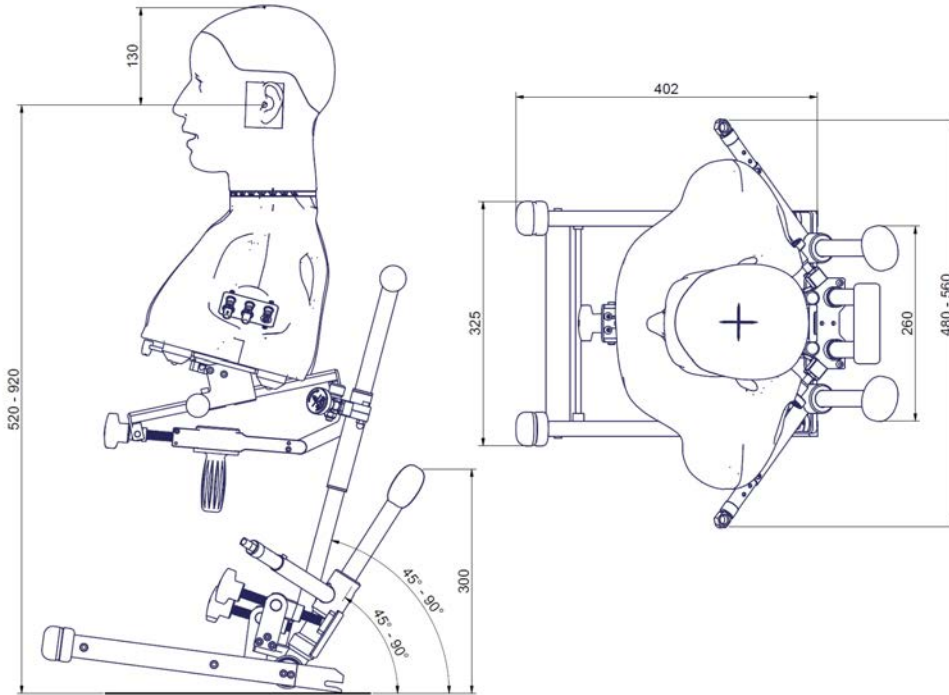


| Part no                                   |             | 45BD-01  | 45BD-02                         | 45BD-07                       | 45BD-09              | 45BD-10                         | 45BD-15                       |
|---|-------------|--|---------------------------------|-------------------------------|----------------------|---------------------------------|-------------------------------|
| <b>Configuration</b>                      | -           | <b>Sound Quality</b>                           | <b>Sound Quality, Low Noise</b> | <b>Hi-Freq Ear Simulators</b> | <b>Sound Quality</b> | <b>Sound Quality, Low Noise</b> | <b>Hi-Freq Ear Simulators</b> |
| <b>Seat Mount Weight</b>                  | kg          | 9 / 9.75 (with arms and ratchet lashing strap) |                                 |                               |                      |                                 |                               |
| <b>Head and Torso Weight</b>              | kg          | 6 (without mouth) / 6.35 (with mouth)          |                                 |                               |                      |                                 |                               |
| <b>Total Weight</b>                       | kg          | 15 – 16.1                                      |                                 |                               |                      |                                 |                               |
| <b>Seat Fixation</b>                      | -           | ISOFIX or Ratchet Lashing Strap                |                                 |                               |                      |                                 |                               |
| <b>Head Rotation Range</b>                | °           | -120 to +120                                   |                                 |                               |                      |                                 |                               |
| <b>Max Safe Acceleration Exposure</b>     | g (g-force) | 1  |                                 |                               |                      |                                 |                               |
| <b>Mouth Input Impedance</b>              | Ω           |  |                                 |                               |                      | 8 (without PSU)                 |                               |
| <b>Mouth Maximum Power, continuous</b>    | W           |  |                                 |                               |                      | 10                              |                               |
| <b>Mouth Maximum Power, pulsed 2 sec.</b> | W           | No Mouth Simulator                             |                                 |                               |                      | 50                              |                               |
| <b>Mouth Input Impedance</b>              | kΩ          |  |                                 |                               |                      | 20 (with PSU)                   |                               |
| <b>Mouth Gain</b>                         | dB          |  |                                 |                               |                      | 10                              |                               |
| <b>Mouth Input Signal, max.</b>           | Vpp         |  |                                 |                               |                      | 2 (with PSU)                    |                               |
| <b>Mouth Power Supply (PSU), external</b> | V DC        |  |                                 |                               |                      | 24                              |                               |

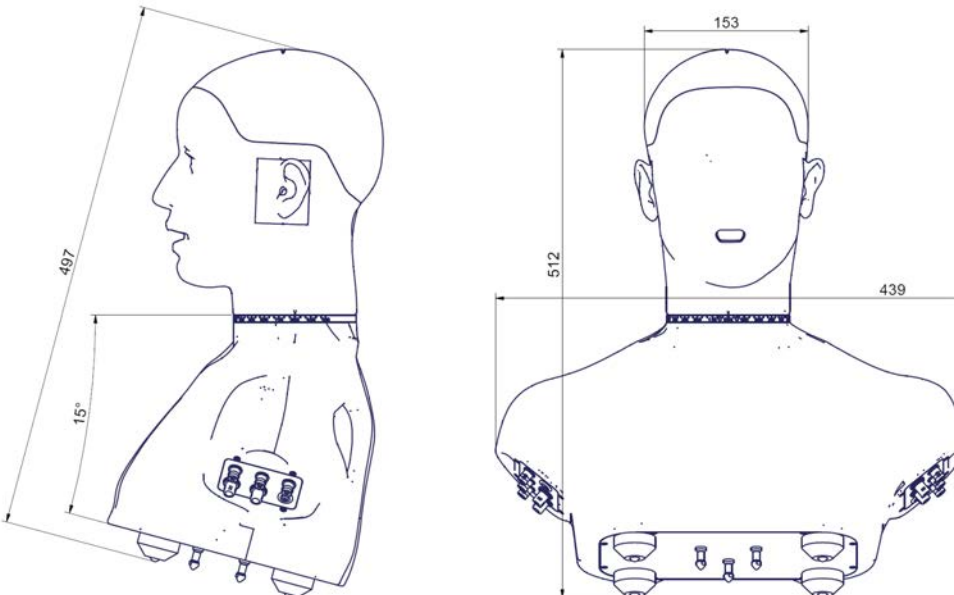


All dimensions in mm.

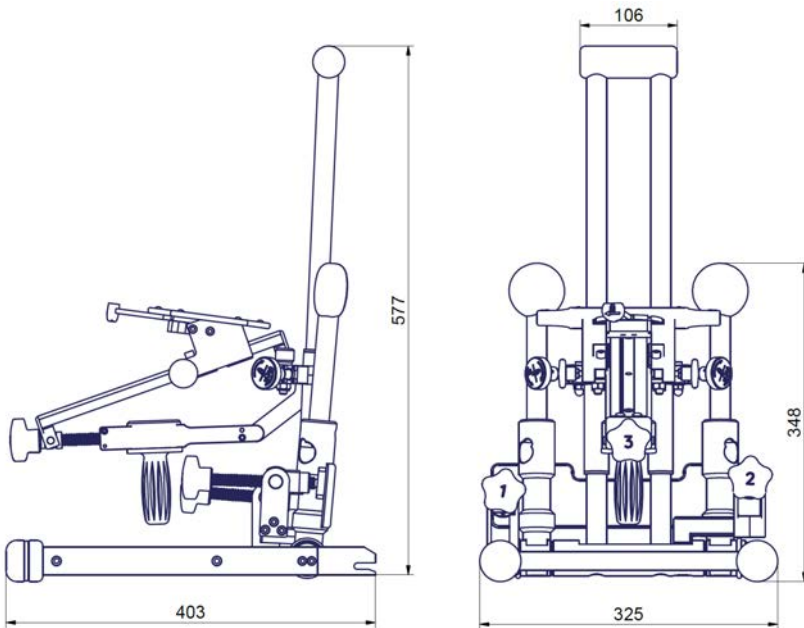
## AutoKEMAR



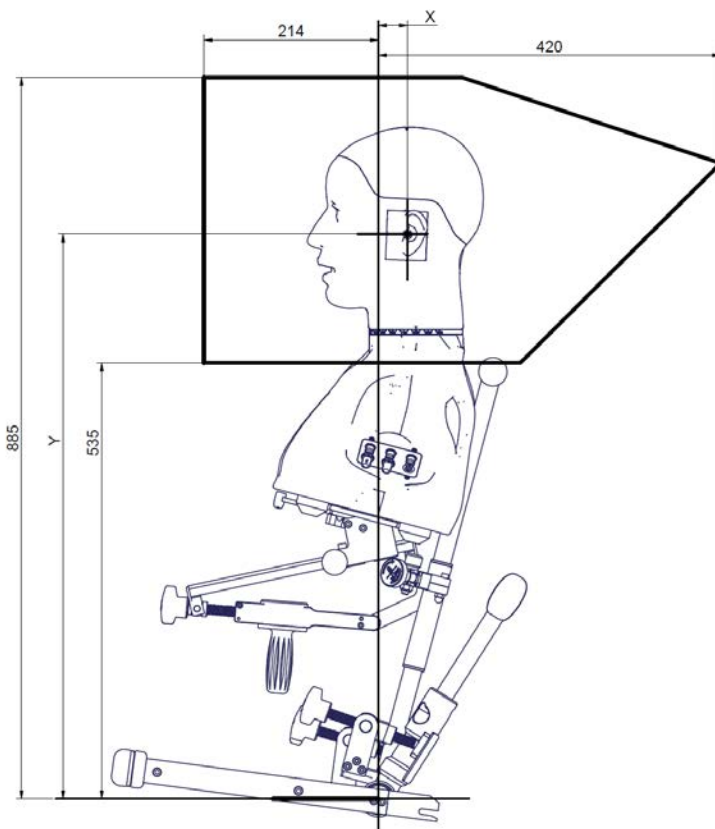
## HATS



## Seat Mount



## Range of Movement



## Included items

### GRAS 45BD-01 AutoKEMAR Sound Quality, 2-Ch CCP

|                        |  |
|------------------------|--|
| GRAS AL0040            | Seat Mount for AutoKEMAR   |
| GRAS 46A0-S2 <b>x2</b> | 1/2" CCP Pressure Microphone Set. Includes 40A0 microphone and 26CK preamplifier |
| GRAS RA0241            | Holder for short 1/2" microphone kit (includes 2 units)                          |
| GRAS KB0090            | KEMAR Large Right Ear, 00 Shore55 (VA/SQ)  |
| GRAS KB0091            | KEMAR Large Left Ear, 00 Shore 55 (VA/SQ)  |
| AA0018-S <b>x2</b>     | 35 cm Cable Microdot – BNC (in use for L-R ears)                                 |
| GRAS YY0018            | 2 mm Allen Key   |
| GRAS YY0028            | 3 mm Allen Key   |
| GRAS YY0013            | 4 mm Allen Key   |
| AA0035 <b>x2</b>       | 3 m BNC - BNC Cable (spare for connection to DAQ)                                |
| AL0038                 | Inclinometer   |
| RA0578                 | Ratchet Lashing Strap for AutoKEMAR  |
| -                      | Product Manual   |
| -                      | Calibration Certificate  |
| -                      | USB Stick with AutoKEMAR data  |

### GRAS 45BD-02 AutoKEMAR Low-Noise Sound Quality, 2-Ch CCP

|                     |   |
|---------------------|---|
| GRAS AL0040         | Seat Mount for AutoKEMAR  |
| GRAS 46CH <b>x2</b> | Low noise sound quality microphone set. Includes 40CH microphone, RA0240 holder, RA0412 adapter and 26CB preamplifier |
| GRAS KB0090         | KEMAR Large Right Ear, 00 Shore55 (VA/SQ)   |
| GRAS KB0091         | KEMAR Large Left Ear, 00 Shore 55 (VA/SQ)   |
| AA0018-S <b>x2</b>  | 35 cm Cable Microdot – BNC (in use for L-R ears)  |



|                  |   |
|------------------|---|
| GRAS YY0018      | 2 mm Allen Key                                    |
| GRAS YY0028      | 3 mm Allen Key                                    |
| GRAS YY0013      | 4 mm Allen Key                                    |
| AA0035 <b>x2</b> | 3 m BNC - BNC Cable (spare for connection to DAQ) |
| AL0038           | Inclinometer                                      |
| RA0578           | Ratchet Lashing Strap for AutoKEMAR               |
| -                | Product Manual                                    |
| -                | Calibration Certificate                           |
| -                | USB Stick with AutoKEMAR data                     |

## **GRAS 45BD-07 AutoKEMAR High-Frequency Coupler, Anthr. Pinna, 2-Ch CCP**

|                       |  |
|-----------------------|--|
| GRAS AL0040           | Seat Mount for AutoKEMAR   |
| GRAS 69CC-8 <b>x2</b> | Prepol Hi-freq 711 Ear Sim incl. angle adaptor and preamp. Includes RA0402 ear simulator, 26CB preamplifier and RA0002 adapter |
| GRAS KB5000           | Large Right Anthropometric Pinna Shore 00-35   |
| GRAS KB5001           | Large Left Anthropometric Pinna Shore 00-35  |
| AA0018-S <b>x2</b>    | 35 cm Cable Microdot – BNC (in use for L-R ears)   |
| GRAS YY0018           | 2 mm Allen Key   |
| GRAS YY0028           | 3 mm Allen Key   |
| GRAS YY0013           | 4 mm Allen Key   |
| AA0035 <b>x2</b>      | 3 m BNC - BNC Cable (spare for connection to DAQ)  |
| AL0038                | Inclinometer   |
| RA0578                | Ratchet Lashing Strap for AutoKEMAR  |
| -                     | Product Manual   |
| -                     | Calibration Certificate  |
| -                     | USB Stick with AutoKEMAR data  |

## **GRAS 45BD-09 AutoKEMAR Sound Quality, w. Mouth, 2-Ch CCP**



|                 |  |
|-----------------|--|
| GRAS AL0040     | Seat Mount for AutoKEMAR   |
| GRAS 46A0-S2 x2 | 1/2" CCP Pressure Microphone Set. Includes 40A0 microphone and 26CK preamplifier |
| GRAS RA0241     | Holder for short 1/2" microphone kit (includes 2 units)                          |
| GRAS KB0090     | KEMAR Large Right Ear, 00 Shore55 (VA/SQ)  |
| GRAS KB0091     | KEMAR Large Left Ear, 00 Shore 55 (VA/SQ)  |
| AA0018-S x2     | 35 cm Cable Microdot - BNC (in use for L-R ears)                                 |
| GRAS YY0018     | 2 mm Allen Key   |
| GRAS YY0028     | 3 mm Allen Key   |
| GRAS YY0013     | 4 mm Allen Key   |
| AA0035 x2       | 3 m BNC - BNC Cable (spare for connection to DAQ)                                |
| AL0038          | Inclinometer   |
| RA0578          | Ratchet Lashing Strap for AutoKEMAR  |
| -               | Product Manual   |
| -               | Calibration Certificate  |
| -               | USB Stick with AutoKEMAR data  |
| -               | Mouth Simulator  |
| -               | Mouth Simulator Power Supply   |
| GRAS 40PM-1     | EQset Microphone   |
| GRAS RA0577     | MRP Positioning fixture for AutoKEMAR  |
| AA0027          | 3 m SMB - BNC Cable  |

## GRAS 45BD-10 AutoKEMAR Low-Noise Sound Quality, w. Mouth, 2-Ch CCP

|              |   |
|--------------|---|
| GRAS AL0040  | Seat Mount for AutoKEMAR  |
| GRAS 46CH x2 | Low noise sound quality microphone set. Includes 40CH microphone, RA0240 holder, RA0412 adapter and 26CB preamplifier |
| GRAS KB0090  | KEMAR Large Right Ear, 00 Shore55 (VA/SQ)   |
| GRAS KB0091  | KEMAR Large Left Ear, 00 Shore 55 (VA/SQ)   |



|                    |   |
|--------------------|---|
| AA0018-S <b>x2</b> | 35 cm Cable Microdot – BNC (in use for L-R ears)  |
| GRAS YY0018        | 2 mm Allen Key                                    |
| GRAS YY0028        | 3 mm Allen Key                                    |
| GRAS YY0013        | 4 mm Allen Key                                    |
| AA0035 <b>x3</b>   | 3 m BNC – BNC Cable (spare for connection to DAQ) |
| AL0038             | Inclinometer                                      |
| RA0578             | Ratchet Lashing Strap for AutoKEMAR               |
| -                  | Product Manual                                    |
| -                  | Calibration Certificate                           |
| -                  | USB Stick with AutoKEMAR data                     |
| UP0001             | AutoKEMAR Mouth Upgrade                           |
| -                  | Mouth Simulator Power Supply                      |
| GRAS 40PM-1        | EQset Microphone                                  |
| GRAS RA0577        | MRP Positioning fixture for AutoKEMAR             |
| AA0027             | 3 m SMB – BNC Cable                               |

## **GRAS 45BD-15 AutoKEMAR High-Frequency Coupler, Anthr. Pinna, w. Mouth, 2-Ch CCP**

|                       |  |
|-----------------------|--|
| GRAS AL0040           | Seat Mount for AutoKEMAR   |
| GRAS 69CC-8 <b>x2</b> | Prepol Hi-freq 711 Ear Sim incl. angle adaptor and preamp. Includes RA0402 ear simulator, 26CB preamplifier and RA0002 adapter |
| GRAS KB5000           | Large Right Anthropometric Pinna Shore 00-35   |
| GRAS KB5001           | Large Left Anthropometric Pinna Shore 00-35  |
| AA0018-S <b>x2</b>    | 35 cm Cable Microdot – BNC (in use for L-R ears)   |
| GRAS YY0018           | 2 mm Allen Key   |
| GRAS YY0028           | 3 mm Allen Key   |
| GRAS YY0013           | 4 mm Allen Key   |
| AA0035 <b>x2</b>      | 3 m BNC – BNC Cable (spare for connection to DAQ)  |



|             |                                       |
|-------------|---------------------------------------|
| AL0038      | Inclinometer                          |
| RA0578      | Ratchet Lashing Strap for AutoKEMAR   |
| -           | Product Manual                        |
| -           | Calibration Certificate               |
| -           | USB Stick with AutoKEMAR data         |
| -           | Mouth Simulator                       |
| -           | Mouth Simulator Power Supply          |
| GRAS 40PM-1 | EQset Microphone                      |
| GRAS RA0577 | MRP Positioning fixture for AutoKEMAR |
| AA0027      | 3 m SMB - BNC Cable                   |

## Optional items

If you are looking to reconfigure an existing AutoKEMAR, use the "AUTOKEMAR RECONFIGURATION GUIDE" available in the product manual.

### Ear Simulators and Microphones

|                                |   |
|--------------------------------|---|
| <a href="#">GRAS RA0045-S1</a> | Prepolarized Ear Simulator According to IEC 60318-4 (60711) |
| <a href="#">GRAS RA0402</a>    | Prepolarized High-Frequency Ear Simulator                   |
| <a href="#">GRAS RA0404</a>    | Prepolarized Hi-Res Ear Simulator                           |
| <a href="#">GRAS 40AO</a>      | Prepolarized Pressure Microphone                            |

### Preamplifiers

|                           |   |
|---------------------------|---|
| <a href="#">GRAS 26CB</a> | 1/4" CCP Standard Preamplifier for Microphone with Microdot Connector |
| <a href="#">GRAS 26CK</a> | 1/2" CCP Standard Preamplifier with Microdot Connector, Very Short    |



## Mouth Simulators

|             |  |
|-------------|--|
| GRAS UP0001 | 45BD AutoKEMAR Mouth Simulator Upgrade |
| GRAS RA0577 | MRP Positioning fixture for AutoKEMAR  |

## Microphones for Mouth Simulator Calibration using RA0577 positioning fixture

|                             |                                     |
|-----------------------------|-------------------------------------|
| <a href="#">GRAS 40PM-1</a> | EQset Minuature Pressure Microphone |
| <a href="#">GRAS 40PM</a>   | EQset Minuature Pressure Microphone |

## Standard Pinnae, SOFT

|                             |                                |
|-----------------------------|--------------------------------|
| <a href="#">GRAS KB1060</a> | Small Right Pinna, 35 Shore 00 |
| <a href="#">GRAS KB1061</a> | Small Left Pinna, 35 Shore 00  |
| <a href="#">GRAS KB1065</a> | Large Right Pinna, 35 Shore 00 |
| <a href="#">GRAS KB1066</a> | Large Left Pinna, 35 Shore 00  |

## Standard Pinnae, HARD

|                             |                                |
|-----------------------------|--------------------------------|
| <a href="#">GRAS KB0060</a> | Small Right Pinna, 55 Shore 00 |
| <a href="#">GRAS KB0061</a> | Small Left Pinna, 55 Shore 00  |
| <a href="#">GRAS KB0065</a> | Large Right Pinna, 55 Shore 00 |
| <a href="#">GRAS KB0066</a> | Large Left Pinna, 55 Shore 00  |

## Anthropometric Pinnae



|                             |  |
|-----------------------------|--|
| <a href="#">GRAS KB5000</a> | Large Right Anthro. Pinna, 35 Shore 00                 |
| <a href="#">GRAS KB5001</a> | Large Left Anthro. Pinna, 35 Shore 00                  |
| <a href="#">GRAS KB5002</a> | Large Right (mirrored left) Anthro. Pinna, 35 Shore 00 |

## Sound Quality Pinnae, SOFT

|                             |                                |
|-----------------------------|--------------------------------|
| <a href="#">GRAS KB1068</a> | Small Right Pinna, 35 Shore 00 |
| <a href="#">GRAS KB1069</a> | Small Left Pinna, 35 Shore 00  |
| <a href="#">GRAS KB1090</a> | Large Right Pinna, 35 Shore 00 |
| <a href="#">GRAS KB1091</a> | Large Left Pinna, 35 Shore 00  |

## Sound Quality Pinnae, HARD

|                             |                                |
|-----------------------------|--------------------------------|
| <a href="#">GRAS KB0068</a> | Small Right Pinna, 55 Shore 00 |
| <a href="#">GRAS KB0069</a> | Small Left Pinna, 55 Shore 00  |
| <a href="#">GRAS KB0090</a> | Large Right Pinna, 55 Shore 00 |
| <a href="#">GRAS KB0091</a> | Large Left Pinna, 55 Shore 00  |

## Ear Simulator / Microphone Holders

|                             |  |
|-----------------------------|--|
| <a href="#">GRAS RA0240</a> | Holder for long 1/2" microphone kit                                |
| <a href="#">GRAS RA0241</a> | Holder for short 1/2" microphone kit                               |
| <a href="#">GRAS RA0517</a> | Kit with GR1874 Ear simulator holder ring for anthropometric pinna |
| <a href="#">GRAS RA0237</a> | Straight ear canal extension kit                                   |

## Microphone to Preamplifier Adapter



|                             |  |
|-----------------------------|--|
| <a href="#">GRAS RA0001</a> | Right-angled (90°) Adapter for 1/2" microphone and 1/4" preamplifier |
| <a href="#">GRAS RA0002</a> | Right-angled adjustable adapter for 1/2" mic/1/4" preamp             |
| <a href="#">GRAS RA0003</a> | Adapter for 1/2" microphone and 1/4" preamplifier                    |
| GRAS RA0412                 | Kit of 8 degr. angular adapters 1/2" to 1/4"                         |

## Power Modules for Pre-polarized Ear Simulators and Microphones

|                           |  |
|---------------------------|--|
| <a href="#">GRAS 12BE</a> | 2-channel CCP Power Module with TEDS Support   |
| <a href="#">GRAS 12AQ</a> | GRAS 12AQ 2-Channel Universal Power Module with signal conditioning and PC interface |
| <a href="#">GRAS 12AL</a> | 1-Channel CCP Power Module with A-weighting filter                                   |

## Flight Case

|              |                                    |
|--------------|------------------------------------|
| GRAS KM0113K | Optional Flight Case for AutoKEMAR |
|--------------|------------------------------------|

## For Calibration

|                           |   |
|---------------------------|---|
| <a href="#">GRAS 42AG</a> | Multifunction Sound Calibrator, Class 1         |
| <a href="#">GRAS 42AP</a> | Intelligent Pistonphone, Class 0                |
| GRAS RA0579               | Calibration Adapter for Sound Quality AutoKEMAR |

## Stand for KEMAR



|             |   |
|-------------|---|
| GRAS AL0041 | Tripod Adapter for AutoKEMAR                  |
| GRAS AL0026 | Tripod Stand (Requires AL0041 Tripod Adapter) |

## Cables

|                             |                          |
|-----------------------------|--------------------------|
| <a href="#">GRAS AA0032</a> | 0.5 m BNC-BNC cable      |
| <a href="#">GRAS AA0033</a> | 1 m BNC-BNC cable        |
| <a href="#">GRAS AA0034</a> | 2 m BNC-BNC cable        |
| <a href="#">GRAS AA0035</a> | 3 m BNC-BNC cable        |
| <a href="#">GRAS AA0036</a> | 5 m BNC-BNC cable        |
| <a href="#">GRAS AA0037</a> | 10 m BNC-BNC cable       |
| <a href="#">GRAS AA0038</a> | 30 m BNC-BNC cable       |
| GRAS AA0018-S               | 35 cm Microdot-BNC cable |
| <a href="#">GRAS AA0070</a> | 3 m Microdot-BNC cable   |
| <a href="#">GRAS AA0071</a> | 5 m Microdot-BNC cable   |
| <a href="#">GRAS AA0072</a> | 10 m Microdot-BNC cable  |



# 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 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](http://www.GRASacoustics.com)

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