

# GRAS RA0399 H-Shaped Holder for 6-Unit Microphone Array Instruction Manual

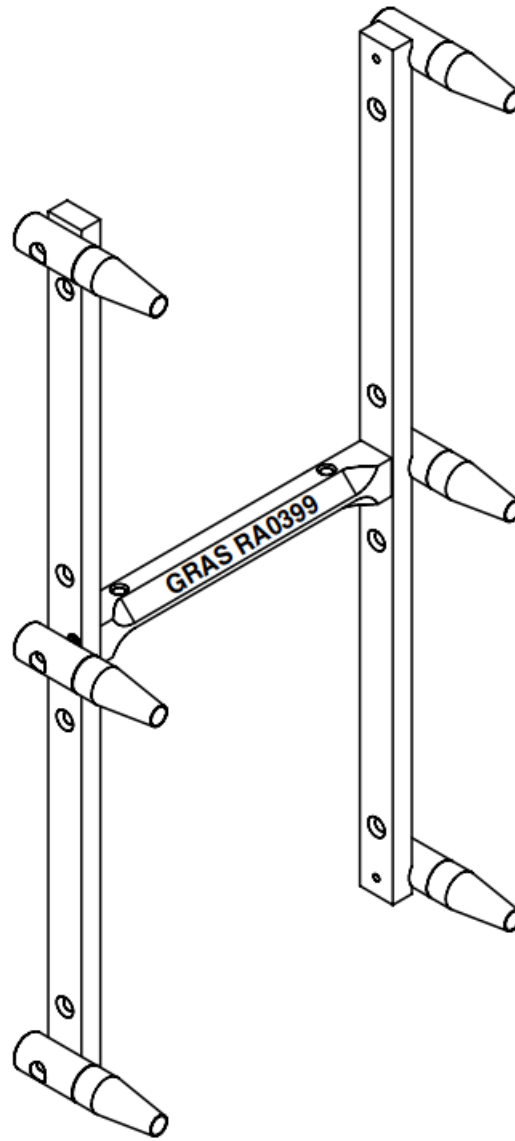
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**GRAS RA0399 H-Shaped Holder for 6-Unit Microphone Array**



## Product Information

The GRAS RA0399 H-shaped Holder is a specially designed holder for a 6-unit microphone array. It is compatible with the GRAS RA0245 microphones and is used for mounting and assembling the microphone set.

### Product Contents:

- 1 x H-shaped holder
- 6 x GRAS RA0245 microphones
- 10 pcs cable strips
- Washer
- Screw 3 mm

## Mounting and Assembling the RA0399 Array Microphone Holder

To mount the microphone holder, follow the steps below:

1. Secure all six microphone holders to the outer side of the holder using the indicated holes on both sides and the six screws provided.

2. Unscrew the cap from the holder.
3. Connect the cable and microphone set together.
4. Screw the cap tightly onto the holder.

## Application Guidelines

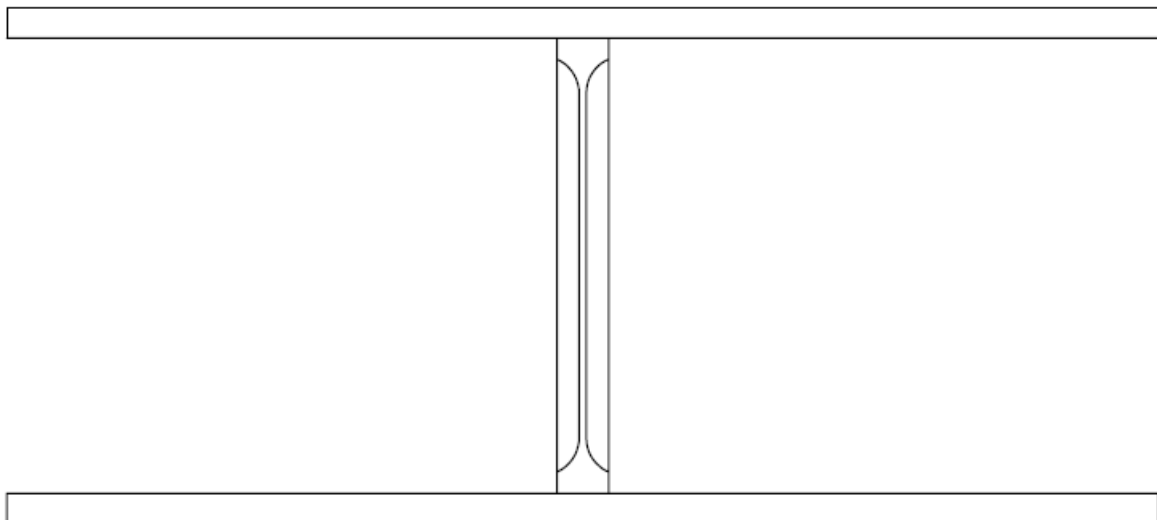
- The GRAS RA0399 holder is specially designed to meet the specifications outlined in the AES Technical Committee on Automotive Audio [TC-AA] whitepaper from 2023. It is recommended for in-car acoustic measurements and works best with the GRAS 46BC or 46BL-1 high sensitive microphone set.
- The whitepaper suggests using a 6-unit microphone array for frequency response characterization in most automotive sound systems. The array should be positioned in the driver's seat and additional measurements can be performed with at least one vehicle seat position on each seat row.
- Please refer to the whitepaper for detailed guidelines on microphone array construction, placement, and dimensions.

## Delivered Items

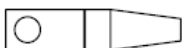
### GRAS RA0399 H-shaped holder for a 6-unit microphone array, consisting of:

- H-shaped holder
- 6 pcs RA0245 – Microphone holder for 1/4" microphone arrays.
  - Each RA0245 consists of 1 x Microphone holder, 1 x Washer, 1 x Screw 3 mm
- 10 pcs cable strips

### 1 x H-shaped holder



### 6 x GRAS RA0245



Microphone holder for  
1/4" microphone arrays

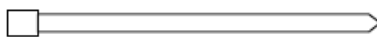


Washer



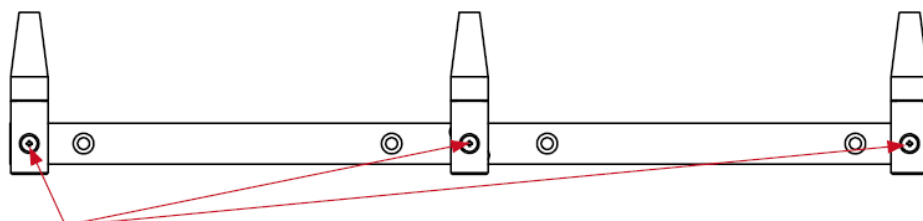
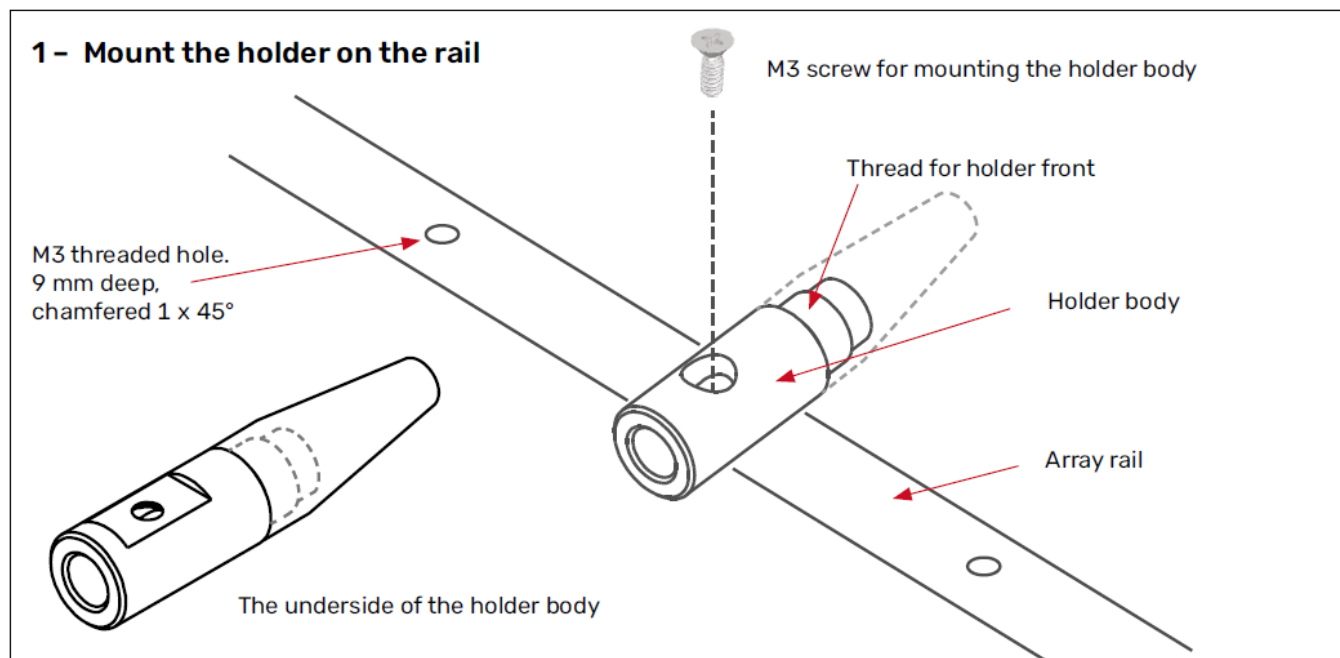
Screw 3 mm

## 10 pcs cable strips

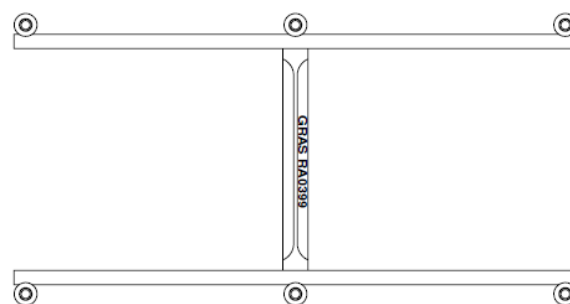


### Mounting the Microphone Holder

How to mount the holder is shown in the illustrations below



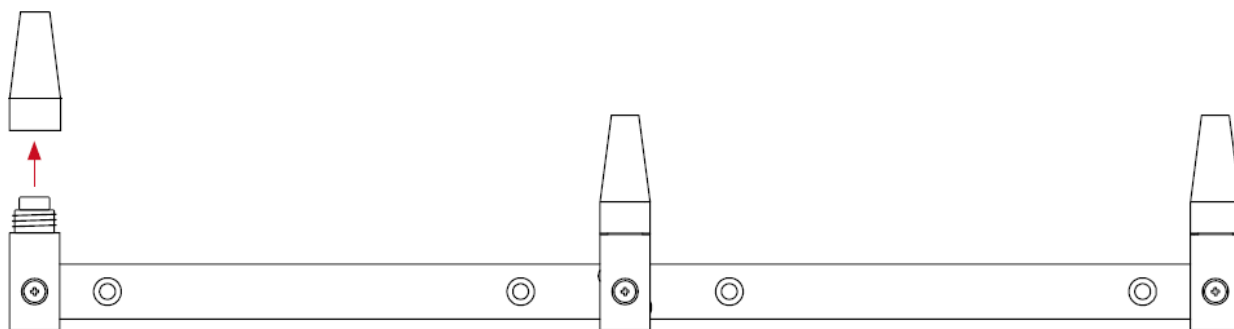
Secure all six microphone holders to the outer side of the holder in the indicated holes on both sides using the six screws.



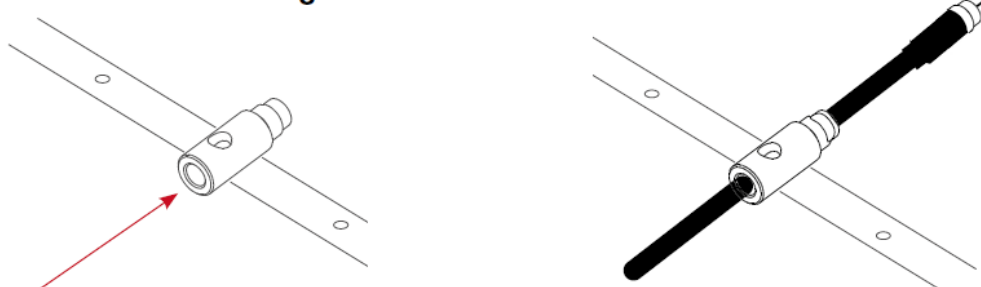
Seen from above

### Mounting the Microphone set in the holder

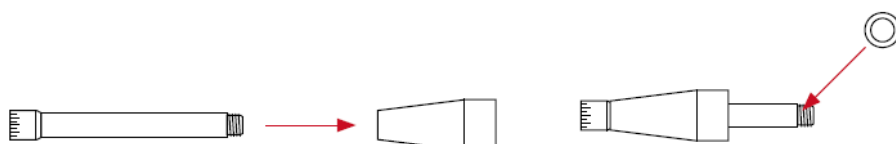
## 2 - unscrew the cap from the holder



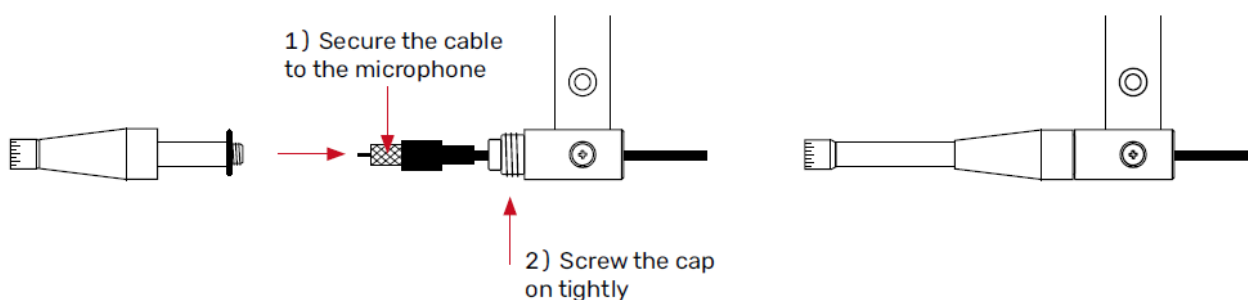
## 3 - Slide the cable through the holder



## 4 - Place your 1/4" microphone in the cap and place the washer on the microphone

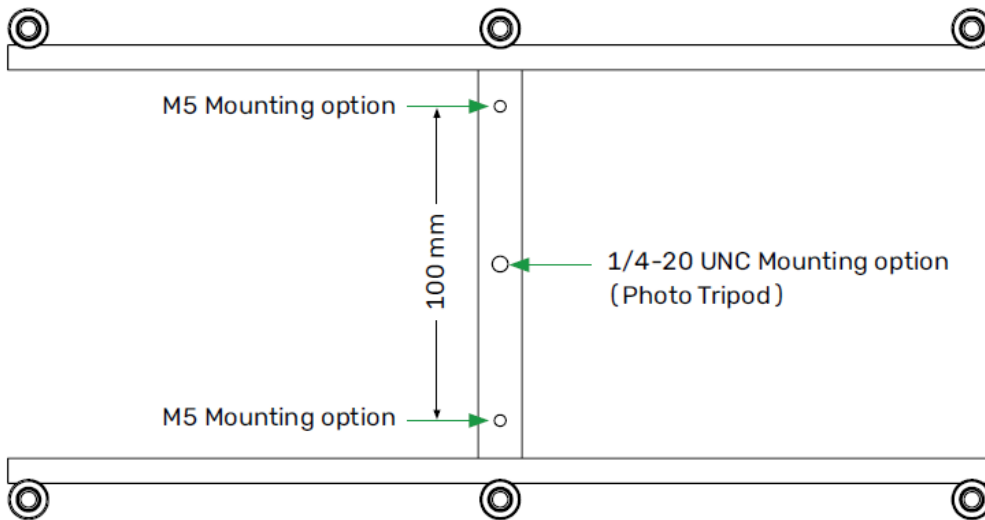
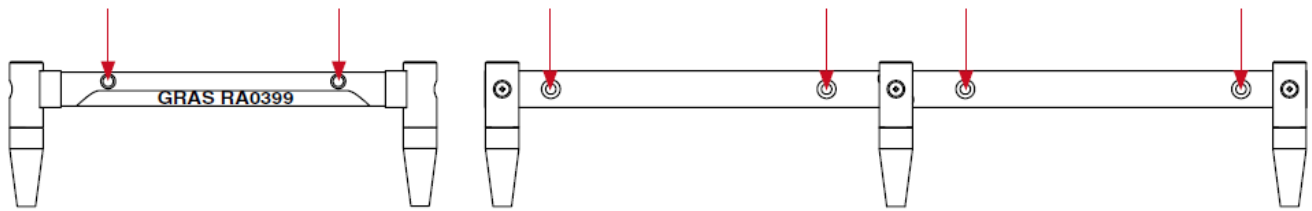


## 5 - Connect the cable and microphone set together and screw the cap onto the holder



## 6 – CableFix option

- Holes are available for holding the cables with strips or clips.
- A center hole is available for mounting the array on for example a tripod.
- 2 x M5 holes, 100 mm apart, are also available if you want to make your own fixture



## Application guidelines

- The AES Technical Committee on Automotive Audio [TC-AA] has developed some very useful guidelines for In-car Acoustic measurements in a whitepaper from 2023.
- The RA0399 holder is specially designed to meet the specification in the whitepaper.
- Together with the GRAS 46BC or 46BL-1 high sensitive microphone set, it fulfills the complete test demands in the white paper.

From AES Whitepaper

- **Microphone Array and Positioning**

Measurements with microphones in the driver's seat are mandatory. Additional measurements should be performed with at least one vehicle seat position on each seat row.

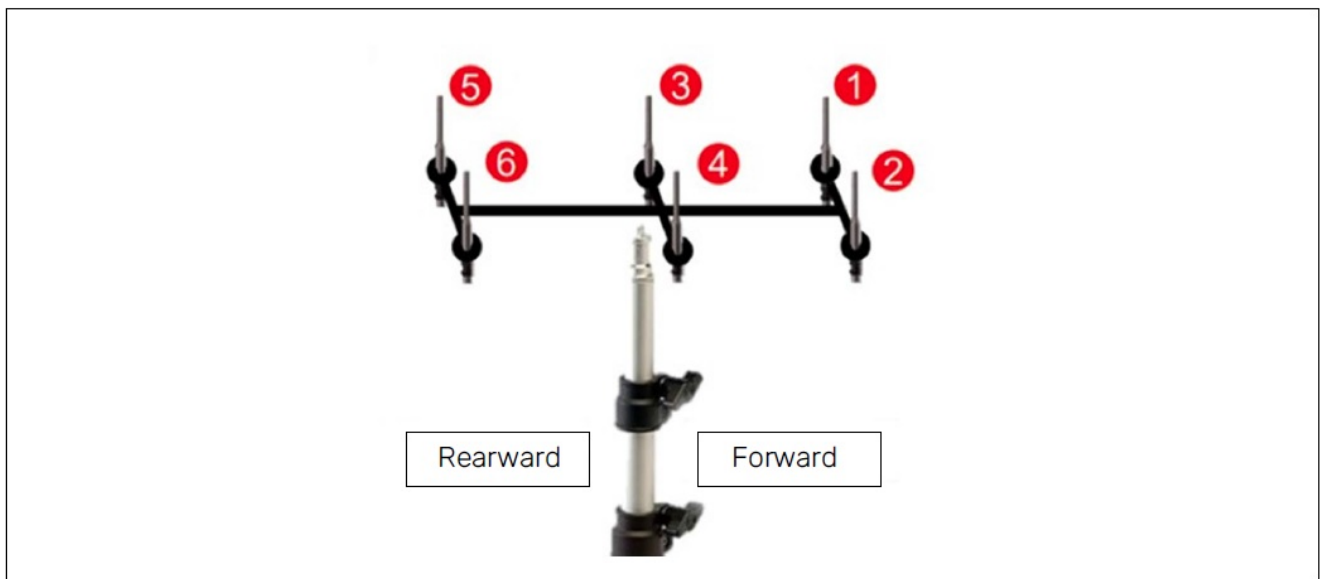
- **Devising the standard array**

A 6-unit microphone array is considered both necessary and sufficient for the characterization of frequency response in most automotive sound systems.

It should be noted that the proposed array is not intended for near-field or in-seat style speaker systems.

- **Array microphone basic specifications**

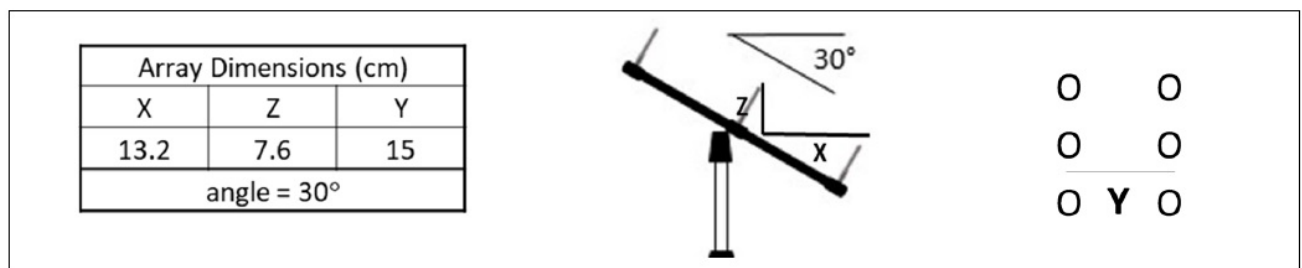
Microphone type, size, and orientation were studied. Pressure field microphones are recommended due to their inherent insensitivity to orientation issues. For full bandwidth measurements 6 mm pressure field microphones pointing up are recommended. Numbering convention as shown in Figure A8.



**Figure A8 :** Microphone Array Recommended arrangement and numbering

- **Array Construction**

Based on the experience and research of the committee, and following the original paper by Geddes and Blind [Blind 1984], the array dimensional recommendations are as given in Figure A9 below. For background, see the discussion in appendix (X)



**Figure A9 :** Microphone array dimensions

### Array Placement

Two placement alternatives are recommended based on the two most highly anticipated use cases considered by the committee. One is relevant for those users that have access to actual head location data for the vehicle being measured, and one is of more general use when that information is not easily obtainable. In either case, it is also necessary to document the location of the array with reference to fixed points of the vehicle interior so that the

setup can be repeated reliably.

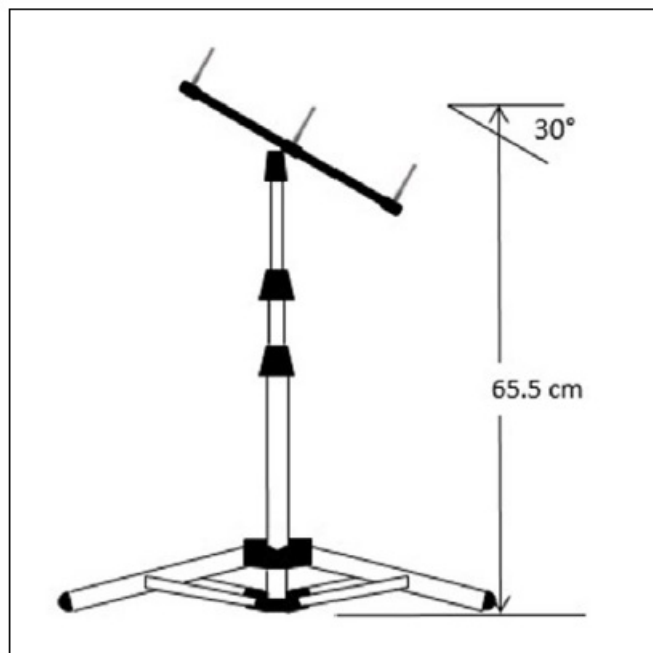
- Method 1 – Head Location information is available

When eyellipse or earllipse data is available, the center of the array should be placed at the appropriate median head location for the specific vehicle, or other internal reference. This point should be expressly documented with the measurement data set.

- Method 2 – No head location information available

When eyellipse or earllipse data is not available, the array can be positioned as shown in Figure A10 below.

The center of the array should be positioned at the ear position where a median person would sit comfortably (168.5 cm (5'-6") if no other data is available). It is then necessary to document the position of the array relative to a set of fixed points in the interior (steering wheel, dashpoints, b-pillar, etc.).

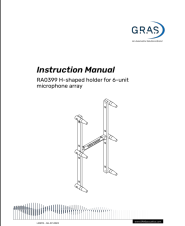


### Manufactured to conform with

- CE marking directive: 93/68/EEC
- WEEE directive: 2002/96/EC
- RoHS directive: 2002/95/EC

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

### Documents / Resources

	<p><a href="#">GRAS RA0399 H-Shaped Holder for 6-Unit Microphone Array</a> [pdf] Instruction Manual RA0399 H-Shaped Holder for 6-Unit Microphone Array, RA0399, H-Shaped Holder for 6-Unit Microphone Array, H-Shaped Holder, Holder</p>
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