

Surface Microphone Type 40PS

Product Data and Specifications

Applications

- *Wind-induced noise on ground and airborne vehicles*
- *Acoustic radiation from surfaces*
- *Noise tests in wind tunnels*
- *Comparing the external noise on a moving vehicle with its internal noise*

And features

- *Low sensitivity to base bending*
- *Water-repellent grid*
- *Dust protected*
- *Built-in CCP¹ preamplifier with TEDS²*
- *Low mass contribution to thin panels*
- *Includes fairing, protection grid and mounting pads*
- *Fairing affords near-flush mounting on curvilinear surfaces*
- *Aluminium mounting plate available for screw mounting*
- *Pistophone calibration*
- *5 mV/Pa sensitivity*
- *20 Hz to 20 kHz frequency range*
- *<32 dBA to 136 dB dynamic range*
- *-20 °C to 80 °C working temperature (-4 °F to 176 °F)*

The G.R.A.S. Surface Microphone Type 40PS (Fig. 1) is a low-cost microphone for general purpose measurements on planar and curved surfaces exposed to slipstreams. Its wide audio frequency range extends from 20 Hz to 20 kHz (Fig. 8) and its large dynamic is from below 32 dBA to 136 dB.

It has an integrated CCP¹ preamplifier with a built-in TEDS² chip which enables the Surface Microphone



Fig. 1 Surface Microphone Type 40PS
Left: with fairing
Right: without fairing

as a whole to be programmed as a complete single unit.

Close manufacturing tolerances together with the advantages of the TEDS chip, provide the Type 40PS with a high degree of interchangeability; a major advantage which excludes accounting for individual characteristics.

The Type 40PS requires a constant-current power supply such as the G.R.A.S. CCP Supply Type 12AL, or any other compatible constant-current power supply.

The Type 40PS is both stable and robust and has an integrated 1 m co-axial cable with a microdot connector. It is delivered with a supple detachable silicon-rubber fairing.

Because of its lightness, the Type 40PS:

- a) can be readily mounted with its fairing on surfaces using a double-sided adhesive pad
- b) contributes very little mass to thin plates

Pressure equalisation is via a vent placed at the front of the microphone just by the side of its diaphragm.

¹ CCP stands for Constant Current Power.

² Transducer Electronic Data Sheet - according to IEEE-1451.4

G.R.A.S.
Sound & Vibration

Skovlytoften 33
2840 Holte, Denmark
Tel +45 45 66 40 46 Fax +45 45 66 40 47
e-mail: gras@gras.dk www.gras.dk

Surface Microphone Type 40PS

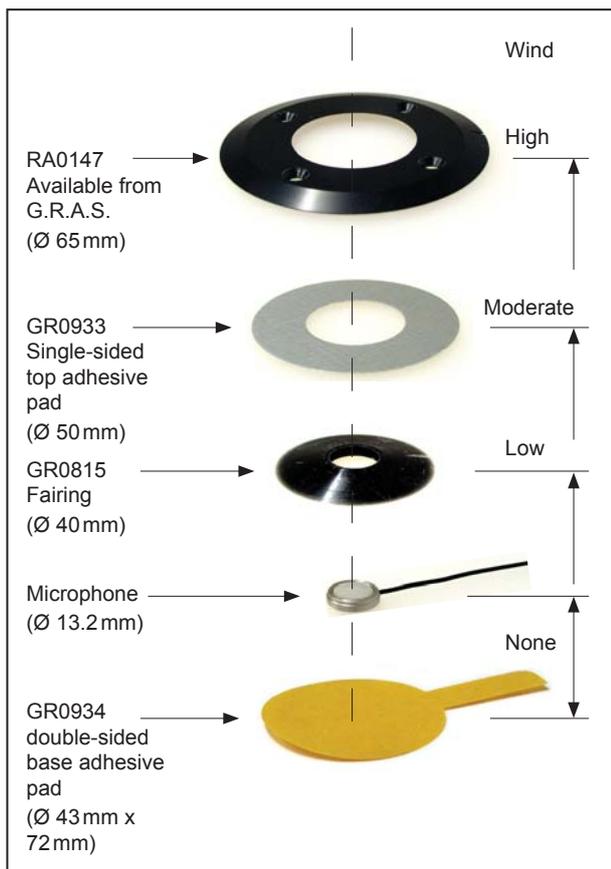


Fig. 2 Exploded view of all possible methods of securing the Surface Microphone to its mounting point

This is important especially when used on aircraft and on road vehicles in mountainous country.

Mounting Methods

Depending on ambient wind-speeds, there are several methods of securing the Surface Microphone to its mounting point. Fig. 2 shows these in the form of an exploded diagram.

When there is no wind, the microphone need only be secured in place using the double-sided adhesive pad (possibly trimmed to match the size of the microphone alone).

For low wind speeds, e.g. on the side of a car (see Fig. 3), include the Fairing.



Fig. 3 An array of four Surface Microphones mounted on the external surface of a car

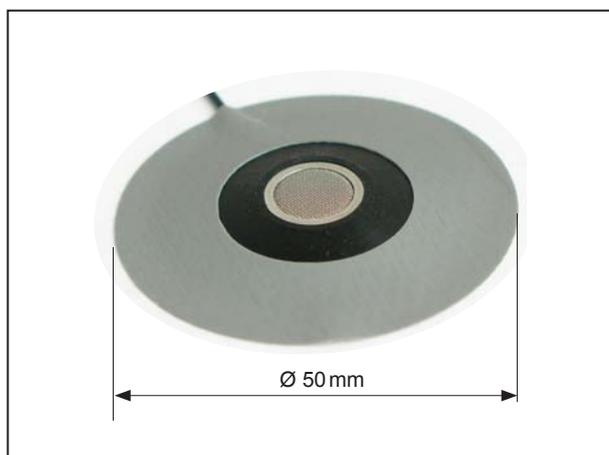


Fig. 4 Showing how the Top Adhesive Pad (GR0933) secures the Surface Microphone in place

At moderate wind speeds, e.g. a wind tunnel, include the single-sided adhesive pad (see Fig. 4).

At high wind speeds, e.g. on the fuselage of a low-speed test aeroplane, include the aluminium mounting plate (see Fig. 5) and four screws.

Low Profile

Together with any of the G.R.A.S. mountings, the profile of the surface microphone will not exceed 3 mm.

Surface Microphone Type 40PS



Fig. 5 Aluminium mounting plate (RA0147) available from G.R.A.S.

Pistonphone Calibration

The Type 40PS can be easily calibrated using a G.R.A.S. Pistonphone and a special Adapter RA0145 (see Fig. 6).

Individual Calibration

All G.R.A.S. Surface Microphones are individually checked and calibrated before leaving the factory.



Fig. 6 Showing how the Type 40PS can be calibrated using a Pistonphone and an Adapter (both available from G.R.A.S.)

An individual calibration chart is supplied with each microphone. Fig. 7 shows an example of the data for an individual Surface Microphone. The chart also includes an individual pressure frequency response (See Fig.8)

Calibration Chart For Type 40PS Surface Microphone		G.R.A.S. Sound & Vibration
40PS Serial No.	78662	
Sensitivity :	7.40 mV/Pa -42.53 dB re. 1V/Pa	
Date:	20-dec-06	The calibration is performed by comparison with a Reference Microphone Cartridge Type 40BP, and is traceable to the National Physical Laboratory, UK. The stated sensitivity is the sensitivity for the complete microphone unit including preamplifier. The frequency response is recorded as a comparison between a reference microphone 40BP and this surface microphone. (See back for more information)
Operator :	KMA	
Environmental Calibration Conditions:		
Temperature :23 ± 3 C°	
Relative humidity :60 ± 20 %	
Barometric pressure :101.3 ± 3 kPa	

Fig. 7 Part of a calibration chart showing data for an individual Surface Microphone. The chart also includes an individual pressure frequency response (See Fig.8)

Surface Microphone Type 40PS

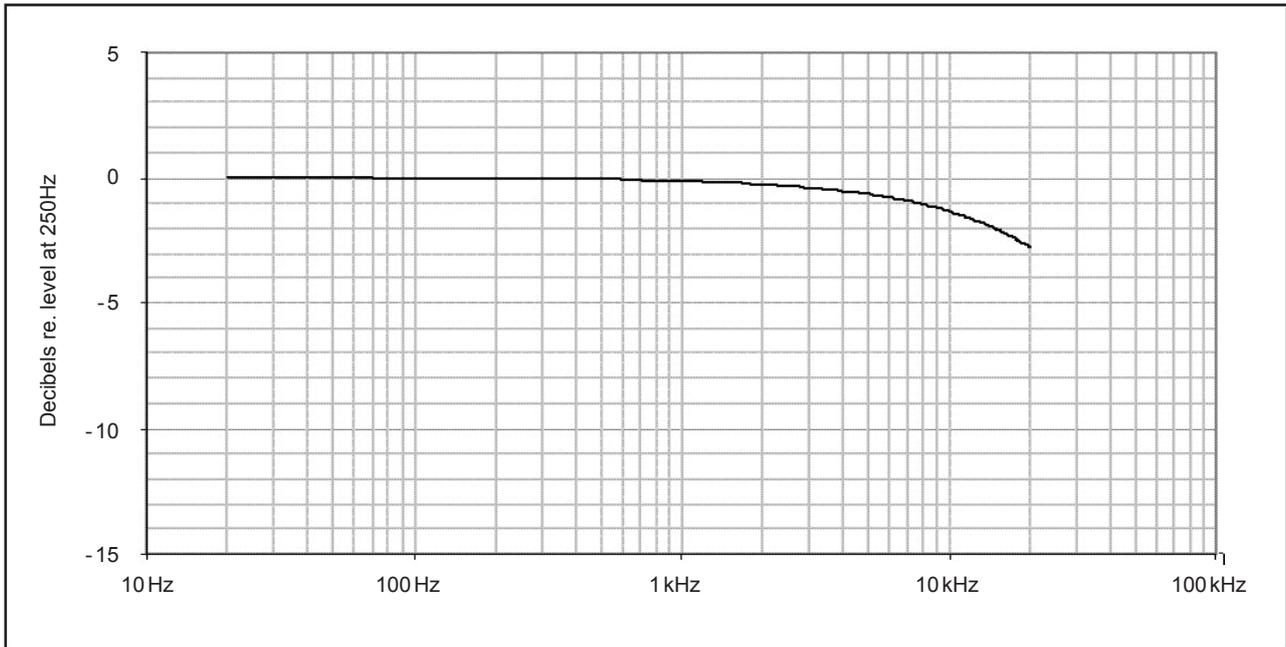


Fig. 8 Typical pressure frequency response of the Surface Microphone Type 40PS

Specifications

Values quoted for 23 °C and 4 mA supply	
Nominal Sensitivity:	
at 250Hz	5 mV/Pa
Frequency Response:	
±1 dB	100 Hz - 3 kHz
±3 dB	20 Hz - 10 kHz
±6 dB	20 Hz - 20 kHz
Upper Limit of Dynamic Range:	
Max. without clipping	136 dB re. 20 µPa
Lower Limit of Dynamic Range:	
Thermal noise	< 32 dBA re. 20 µPa
Temperature Range:	-20 °C to +80 °C
Output impedance:	< 50 Ω
Output:	Integral cable with coaxial microdot connector
Cable:	
length:	1.5 m
diameter:	1.1 mm
special:	on request
Thickness:	2.8 mm
Diameter:	
With fairing	40 mm
Without fairing	13.2 mm
Weight:	3 g
Power supply:	2 mA to 10 mA (typically 4 mA)
Accessories included:	
Fairing:	GR0815
Top adhesive pad (0.5 mm):	GR0933 (pre-cut, single-sided)
Base adhesive pad (0.13 mm):	GR0934 (pre-cut, double-sided)
Cleaning tissue:	MI0031
Adapter:	AE0046 (BNC male to microdot female)
Available accessories:	
Aluminum mounting plate	RA0147
Pistonphones:	Types 42AA/42AP
CCP supply:	Type 12AL
Calibration adapter:	RA0145 (for use with Pistonphone)

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

G.R.A.S.
Sound & Vibration

Skovlytoften 33
2840 Holte, Denmark
Tel +45 45 66 40 46 Fax +45 45 66 40 47
e-mail: gras@gras.dk www.gras.dk