G.R.A.S.
SOUND & VIBRATION

Instruction Manual

40SA/40SC Probe Microphones

3. Calibration

The following explains how to calibrate both the level and frequency responses of the Probe Microphone.

3.1 Level Calibration

To calibrate the Probe Microphone with a pistonphone such as the GRAS Type 42AA, first ensure that the pistonphone is fitted with a coupler for calibrating ½ microphones (in the case of the Type 42AA, this is standard). The Probe Microphone comes with two ½ calibration adapters, i.e.:

- GR0265 for stainless steel probes
- GR0266 for flexible probes

Fit the appropriate adapter to the Pistonphone's coupler. Insert the tip of the probe into the calibration adapter [2] (see Fig 3.1) and turn on the pistonphone. For a Pistonphone Type 42AA, the sound pressure at the probe tip will be 114 dB re. 20 µPa. Since the load-volume correction for the probe is 0 dB, the only corrections necessary will be for the barometric pressure.

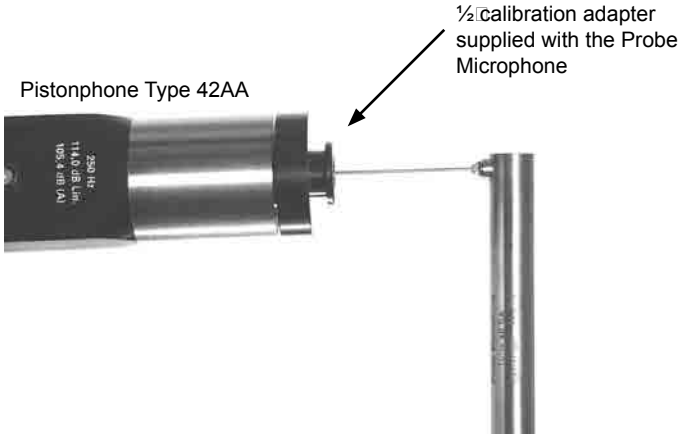

Fig. 3.1 Level calibration using Pistonphone Type 42AA

3.2 Frequency-response Calibration

Frequency-response calibration can be performed either as a free-field calibration using a suitable sound source and ¼″ microphone in an anechoic chamber or as a pressure-response calibration using the Calibration Coupler RA0236 included with the Probe Microphone.

3.2.1 Calibration Coupler RA0326

To use this coupler, an emitting microphone and a receiving microphone are required. These are not part of the standard Probe Microphone.

The emitting microphone is inserted in one end of the coupler and the receiving microphone in the other end (see Fig 3.2).

The probe tip is inserted in the appropriate hole in the side of the coupler. There are two of these on opposite sides of the coupler, one for stainless-steel probes and one for flexible probes. The hole not in use should be closed off with an insert pin.

[2] The probe tip must not make contact with any surface inside the calibration adapter since this will block the entrance to the probe.

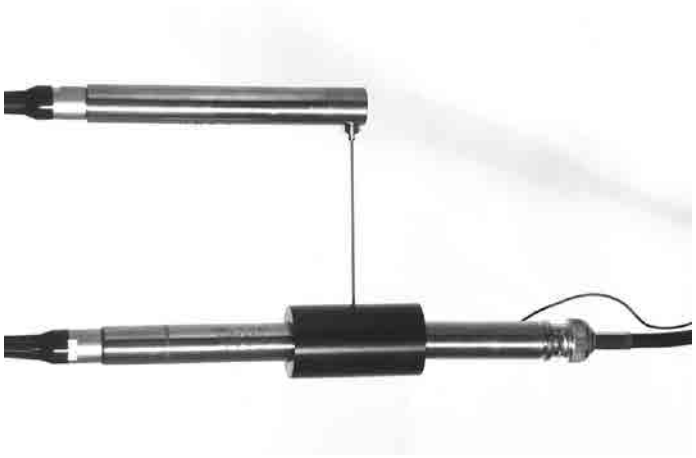

Fig. 3.2 Set up for pressure-frequency response calibration

Apply the test signal to the transmitting microphone and measure the responses of both the receiving microphone Probe Microphone. The response of the Probe Microphone can then be seen as relative to the response of the receiving microphone. Since the sound pressure within the coupler will vary across the diameter of the coupler, make sure that the tip of the probe is positioned at the diametral centre of the coupler[3].

[3] In any event the probe tip must not make contact with the opposite side of the calibration coupler since this will block the entrance to the probe.

4. Service and Repair

Repairs should be carried out only by qualified personal. The Probe Microphone should not be dismantled with power on because of high-voltage circuits.

5. Specifications

Nominal sensitivity at 250 Hz:

3 mV/Pa (individually calibrated)

Dynamic range:

40 dB to 166 dB (re. 20 µPa)

Frequency response (relative to tabular values):

2 Hz - 20 Hz:	±1.5 dB
20 Hz - 250 Hz:	±0.5 dB
250 Hz - 1k Hz:	±0.5 dB
1k Hz - 2k Hz:	±0.8 dB
2k Hz - 5k Hz:	±1 dB
5k Hz - 10k Hz:	±1.5 dB
10k Hz - 20k Hz:	±3 dB

Electrical Output Impedance:

<50 Ω

Power supply:

Type 40SA:

Single	120 V (2.5 mA) to 28 V (0.7 mA)
Dual	±60 V (2.5 mA) to ±14 V (0.7 mA)

Type 40SC:

2 mA to 20 mV (typically 4 mA)

Temperature Range:

Operating:	-25 ºC to 70 ºC
Probe temp. (with heat sink):	max. 800 ºC

Pressure-equalization time constant:

Internal to tip static pressure:	typically 0.1 s

Dimensions:

Length (housing):	83.8 mm
Diameter:	12.7 mm
Weight:	40 g
Probe tube outside diameter:	1.25 mm
Probe tube inside diameter:	1 mm
Cable length:	3 m
Cable diameter:	2.5 mm

Accessories included:

Pistonphone adaptor for 1.25 mm:	GR0265
Pistonphone adaptor for 1.6 mm:	GR0266
Heatsink and tool:	GR0267
Calibration coupler:	RA0326
1.3 mm pin for calibration coupler:	GR0263
1.6 mm pin for calibration coupler:	GR0264
Pair of pliers:	YY0004
File:	YY0005
Silicone grease:	MI0016
Teflon tubing (L: 1 m, Ø: 1.6 mm):	EK0018
20 mm Probe tube:	GR0258
40 mm Probe tube:	GR0259
80 mm Probe tube:	GR0260
160 mm Probe tube:	GR0261
Flexible Probe tube:	GR0401
Needle (for cleaning)	SK5546

Accessories available:

Pistonphone:	Type 42AA
Type 40SA:	
Power modules:	Types 12AA, 12AD or 12AK
Extension cable 3 m:	AA0008
Extension cable 10 m:	AA0009
Type 40SC:	
CCP Supply:	Type 12AL
Power modules:	Types 12AA, 12AD or 12AK (use with CCP Input Adapter AG0002)

Manufactured to conform with:

CE marking directive: 93/68/EEC

WEEE directive: 2002/96/EC

RoHS directive: 2002/95/EC

GRAS Sound & Vibration continually strives to improve the quality of our products for our customers; therefore, the specifications and accessories are subject to change.