

# ***Instruction Manual***

*67SB Blast Probe According to ANSI S12.42*



## Revision History

Any feedback or questions about this document are welcome at [gras@gras.dk](mailto:gras@gras.dk).

Revision	Date	Description
1	23 June 2011	First publication
2	20 April 2012	Revision. Added: In-situ calibration.
3	8 August 2012	Changed part number GU0212 references to GR1462.
4	28 May 2015	Tripod thread corrected to 1/4"

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## Introduction

The 675B Blast Probe According to ANSI S12.42 is designed to meet the requirements of a blast probe suitable for high-level impulse measurements as outlined in ANSI S12.42. The 675B complies with ANSI S12.42 and IEC 61094-1.

The 675B consists of a sturdy aluminium tube and a flush-mounted 1/8-inch externally polarized pressure microphone (40DP) as sensor. The tube has a 3/4 inch thread for mounting on a tripod or similar device.

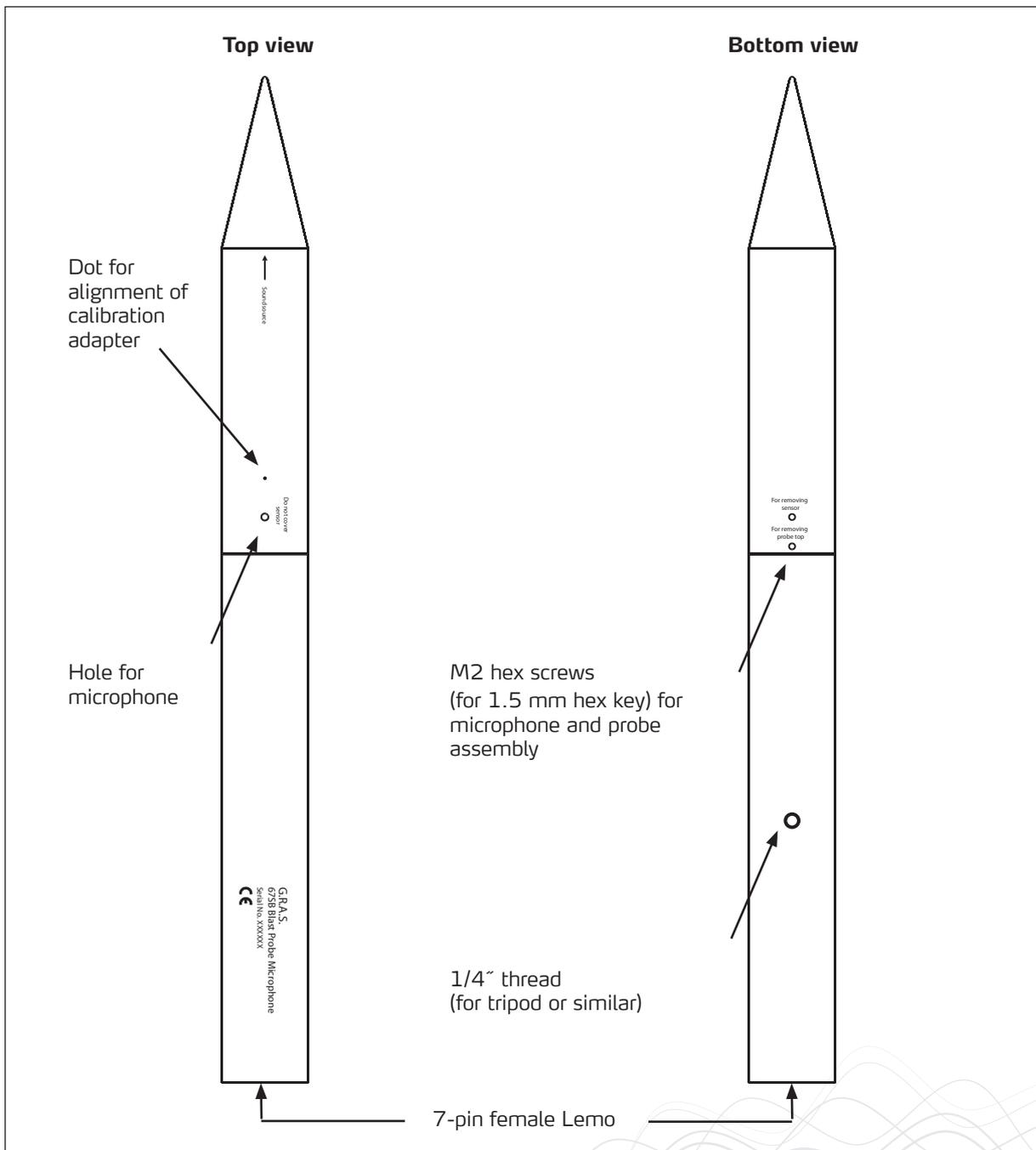


Fig. 1. The 675B seen from above and below.

## The 67SB Package

The 67SB Blast Probe According to ANSI S12.42 is delivered as a preassembled package. The following table list all items delivered with the 67SB. Fig. 2 shows the 67SB in its travel case.

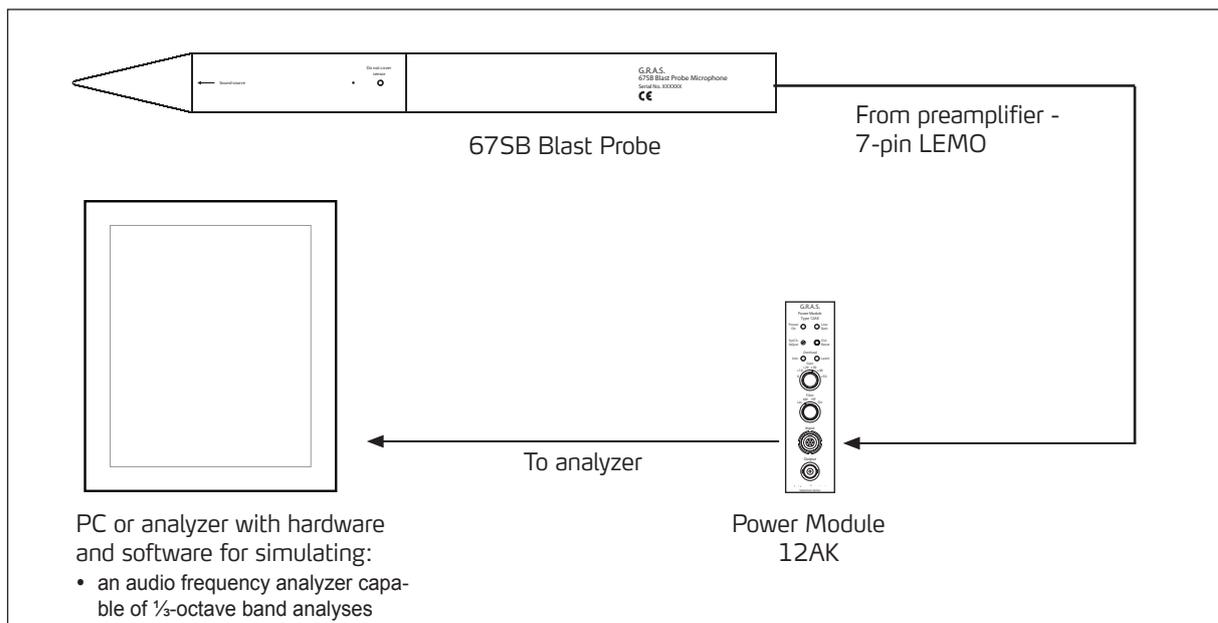
Included Items	Part Number
Blast Probe According to ANSI S12.42 (includes microphone and preamplifier in the probe housing, and a travel case)	67SB
1.5 mm Hex key	YY0012
External Calibration Adapter	GR1462
Calibration plug	GR1423
Manual	LI0056



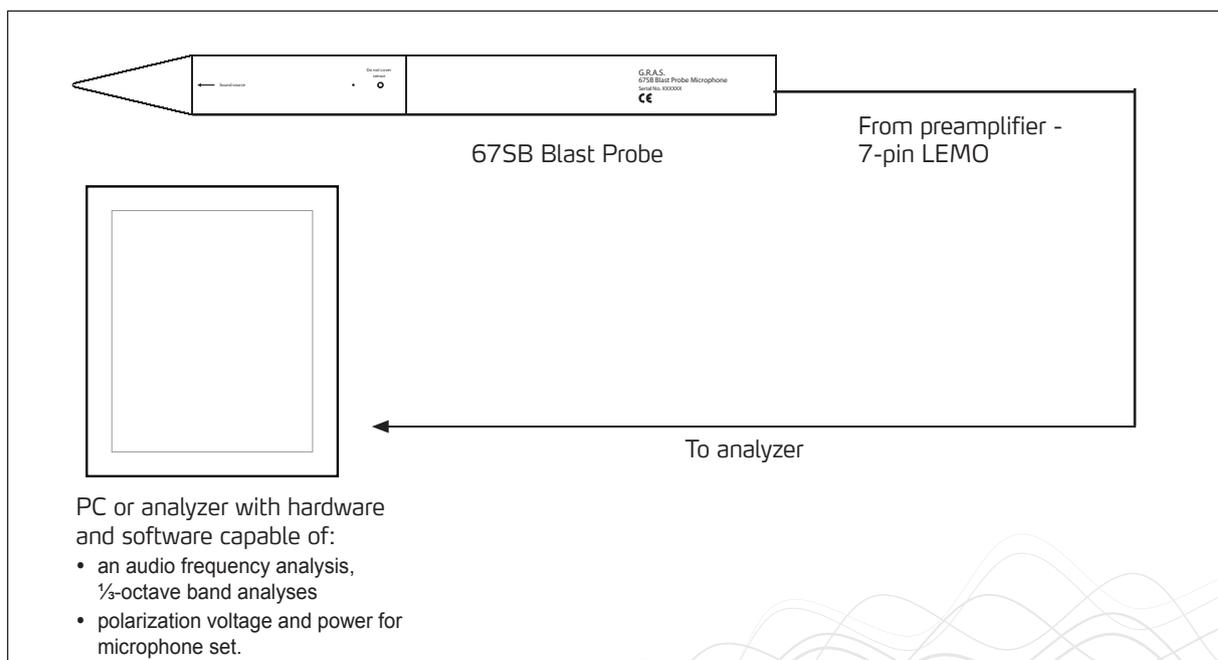
**Fig. 2.** The 67SB in its travel case.

## Measurement Setups

The microphone set inside the probe is a 1/8-inch externally polarized pressure microphone (40DP) and a preamplifier (26AC). The probe must be connected to a power module or analyzer that can provide a polarization voltage of 200 V to the microphone and a supply voltage of  $\pm 60$  V/120 V to the preamplifier. The connection is via a 7-pin male LEMO at the rear end of the tube. The 40DP can handle a peak sound pressure of 174dB. The 67SB uses an externally polarized microphone and is not CCP compatible.



**Fig. 3.** Setup example with power module and analyzer.



**Fig. 4.** Setup example with analyzer capable of powering the microphone set.

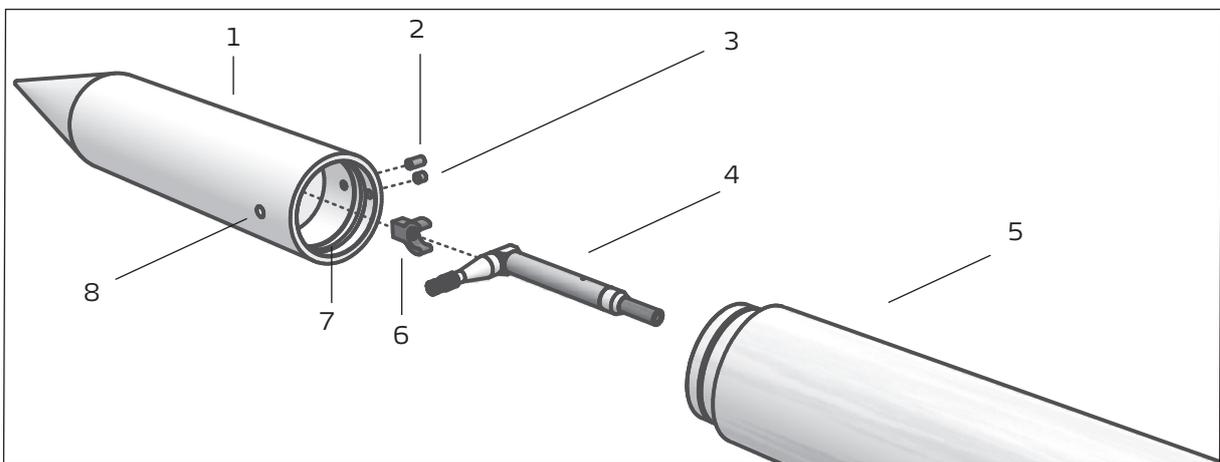
## Removing and Installing the Microphone

This section describes how to remove and install the microphone, for example, when you need to calibrate it.

The main user-accessible parts of the blast probe are shown in Fig. 5. The two tube parts are held in place with a short M2 hex screw (item 3) and an O-ring in a recess inside the front part (Item 1).

### Disconnecting the Two Parts of the Tube

1. Loosen the short M2 hex screw (item 3).
2. Pull the two halves apart. Because of the drag provided by the O-ring (item 7), you may have to wriggle the parts slightly while pulling. Do not use excessive force.



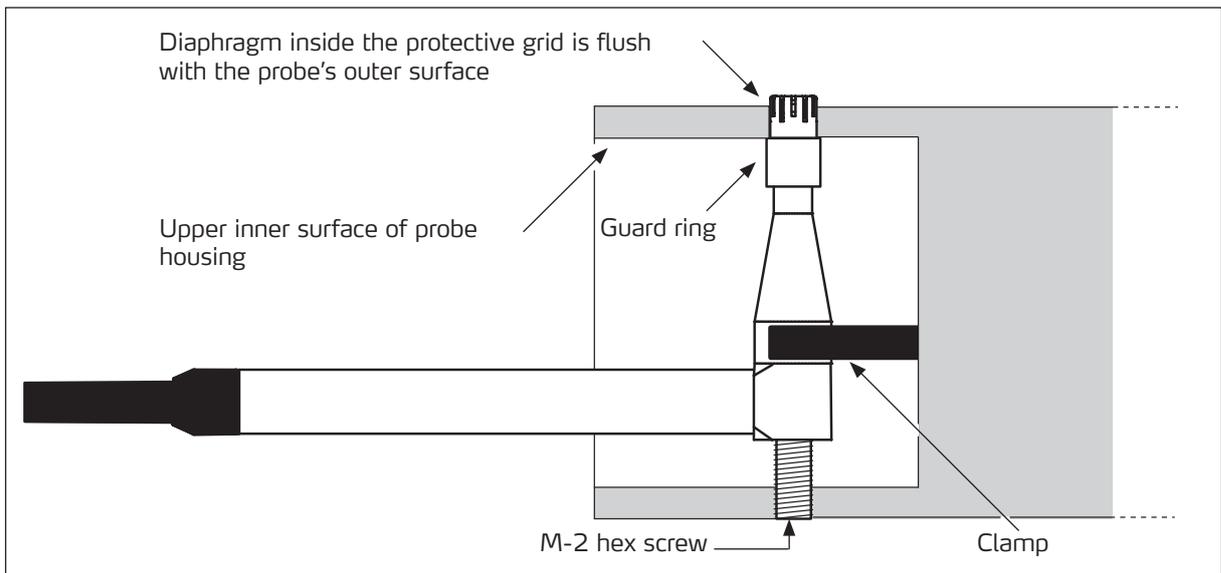
**Fig. 5.** Exploded view of the blast probe.

The parts of the probe as shown in Fig. 5 are

- |  |  |
|--|--|
| <b>1.</b> Probe tube – front.  | <b>5.</b> Probe tube – rear.   |
| <b>2.</b> Long M2 hex screw (for 1.5 mm hex key) for securing the microphone assembly against the tube wall. | <b>6.</b> Clamp for microphone assembly.<br><b>Note:</b> This clamp is only shown outside the front tube for clarity; it is actually fixed inside the tube where it holds the microphone in place. |
| <b>3.</b> Short M2 hex screw for securing the two halves of the blast probe.                                 | <b>7.</b> O-ring.  |
| <b>4.</b> Microphone/preamplifier assembly.  | <b>8.</b> Hole for microphone.   |

## Removing the Microphone Assembly

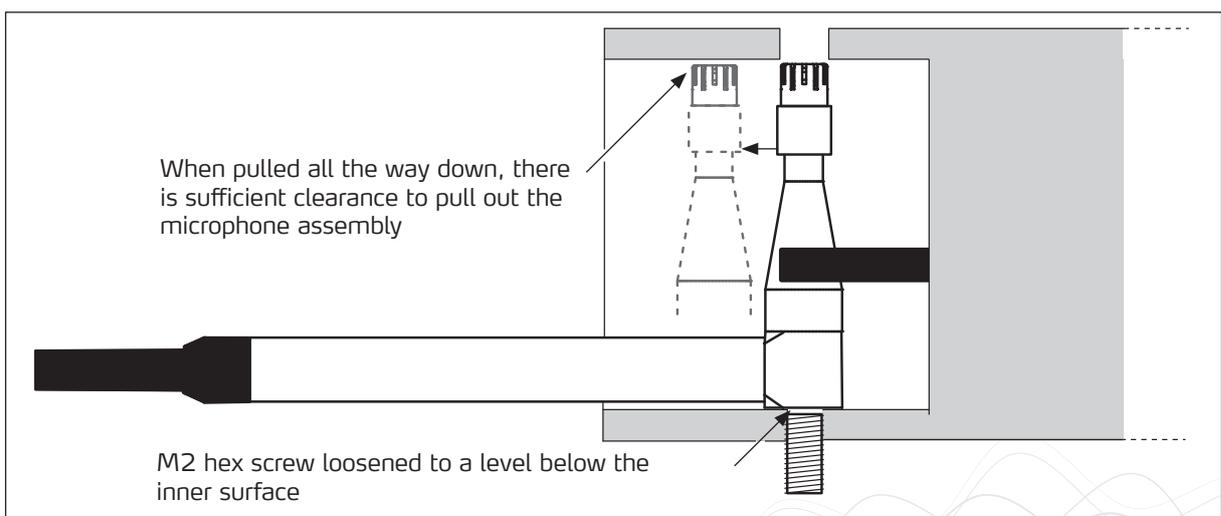
The microphone is secured inside the front tube by a clamp and an M2 hex screw. When positioned in the clamp with the M2 hex screw tightened, the microphone assembly is properly secured. A guard ring below the protective grid ensures seating against the inner surface **and** that the diaphragm is flush with the outer surface of the probe.



**Fig. 6.** The microphone assembly secured by the M-2 hex screw and the clamp.

### To remove the microphone:

1. Use a 1.5 hex key to loosen the M2 hex screw and gently pull the microphone assembly out. The protective grid must be clear of the tube surface (see Fig. 7).
2. Pry the microphone housing loose from the clamp and pull it out of the probe.



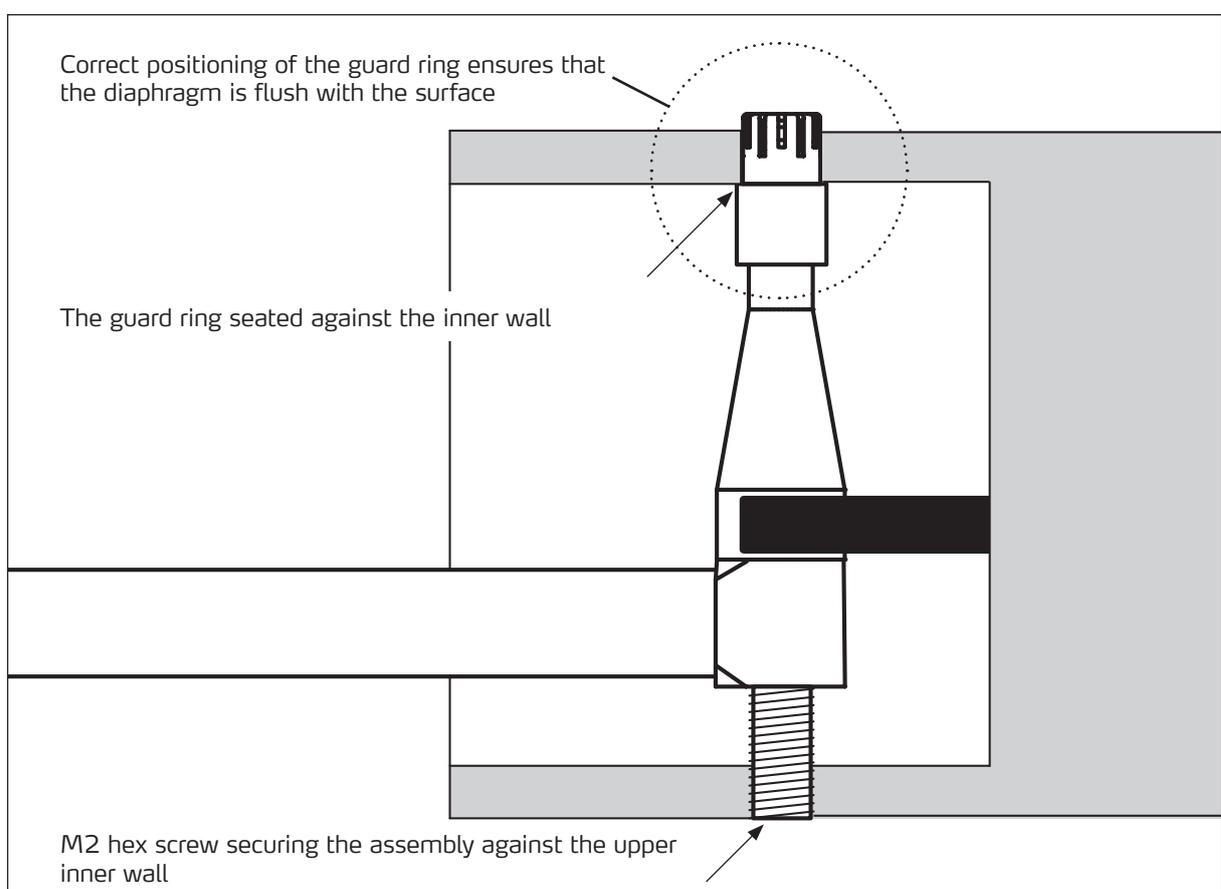
**Fig. 7.** The microphone assembly ready to be pulled out. Notice the clearance above the protective grid.

## Reinstalling the Microphone Assembly

The steps for reinstalling the microphone assembly are basically the reverse of the steps for removing the assembly.

The diaphragm of the microphone must be flush with the outer surface of the probe tube when mounted, as required by the ANSI S12.42 standard. The following ensures that this requirement is met:

- The guard ring must be situated correctly on the microphone assembly. (This is ensured by the design and during assembly at the factory.)
- The guard ring must be properly seated against the upper inner wall of the tube.



**Fig. 8.** The microphone assembly secured properly inside the probe housing.

**Important:** The M2 hex screw should be tightened enough to secure the microphone assembly, but do not use excessive force.

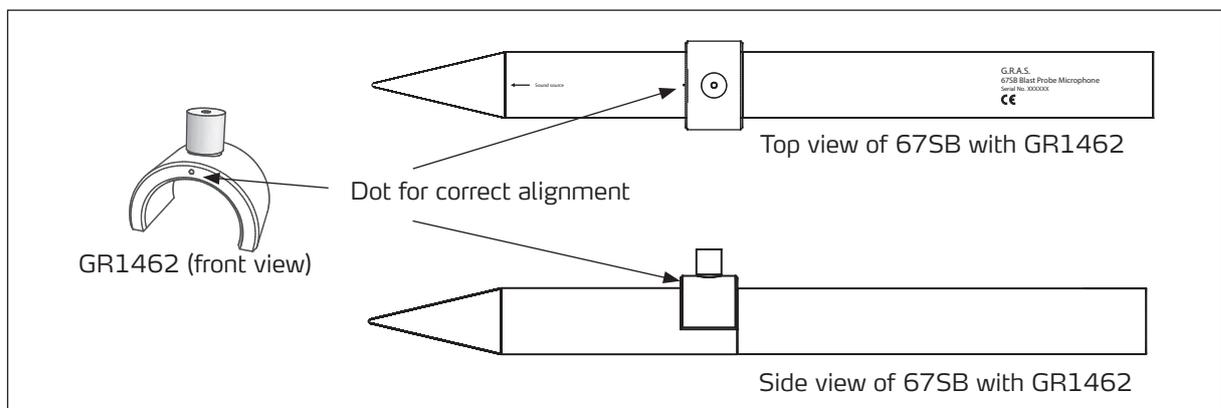
**Important:** Do **not** remove the protective grid and/or the guard ring as this may compromise correct positioning of the diaphragm relative to the probe surface.

## Calibration

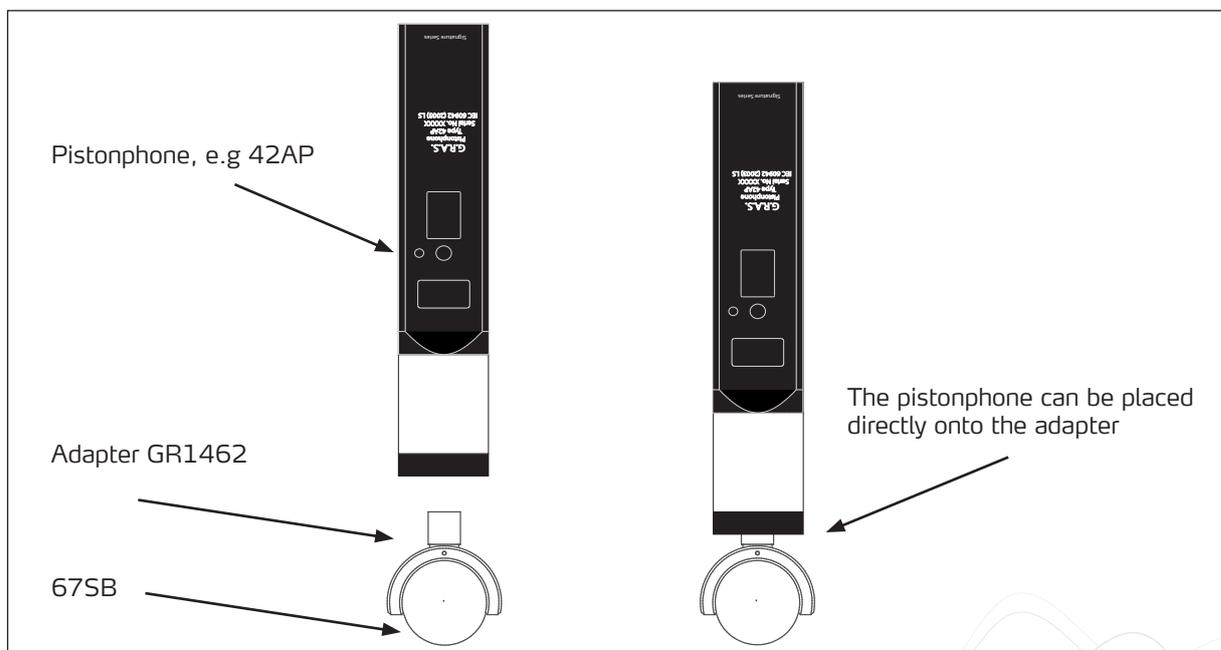
The 67SB is calibrated in a controlled laboratory environment using traceable calibration equipment before leaving the factory. We recommend calibration prior to use to ensure the accuracy of your measurements. You can use any of the G.R.A.S Pistonphones 42AA and 42AP.

### In-Situ Calibration

With the GR1462 External Calibration Adapter, you can calibrate the microphone in the 67SB without dismounting it. The adapter is mounted as shown in Fig. 9. An O-ring inside the adapter ensures a proper fit over the microphone. The correction factor is 0.04 dB.



**Fig. 9.** The 67SB blast probe with GR1462 adapter for in-situ calibration.



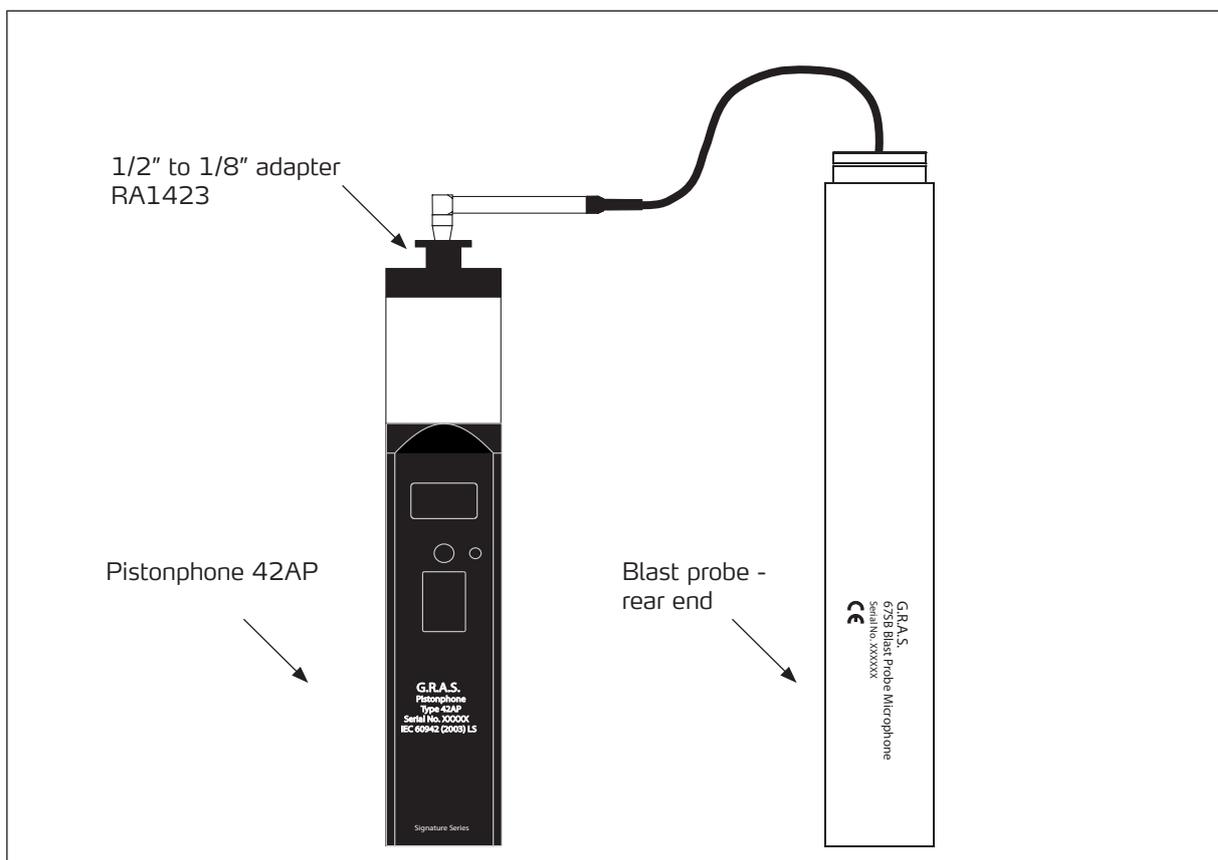
**Fig. 10.** Pistonphone calibration of the 67SB using the adapter GR1462.

## Separate Calibration

You can calibrate the microphone in-situ as described on page 10, but you can also calibrate it separately. In this case, no correction factor is needed.

To calibrate the microphone, you must remove it from the probe tube:

1. Open the blast probe as described on page 7.
2. Pull out the microphone assembly as described on page 8.
3. Mount the Calibration Adapter RA1423 in the pistonphone.
4. Place the blast probe tube next to the pistonphone. Do not attempt to remove the microphone cable from the tube.
5. Push the microphone all the way down into the adapter so that it is sealed by the O-ring inside the adapter.
6. Turn on the pistonphone.



**Fig. 11.** Typical calibration setup using The G.R.A.S. pistonphone 42AP.

## Technical Specifications

### Typical Performance

The following diagram demonstrates the time domain of an impulse as measured by the 67SB. The peak measurement of 6000 Pa in this example is approximately 170 dB.

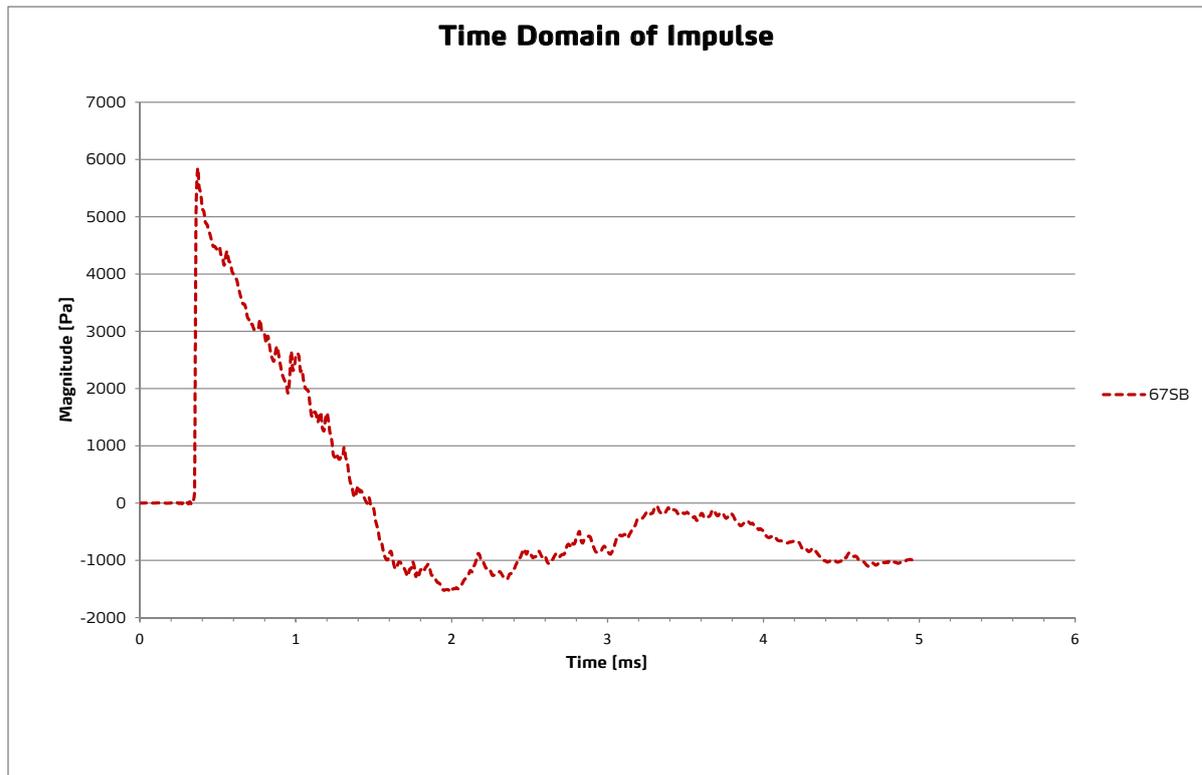


Fig. 12. Typical performance, time domain response of 170 dB impulse.

### Dimensions and Data

<b>Probe Dimensions</b>	
Length	410
Diameter	35
<b>Threads</b>	
Protection Grid	M3.175 x 0.2
Blast probe mounting	¼" thread
<b>Weight</b>	
67SB only	650 g
67SB with case	2750 g

Data was collected in a temperature of 23 °C ( $\pm 3$  °C) and in a relative humidity of 60 %  $\pm 20$  %.

<b>Frequency response for the set</b>	
$\pm 1.0$ dB	10 Hz – 30 kHz
$\pm 2.0$ dB	6.5 Hz – 140 kHz
<b>Resonance frequency</b>	
90° phase shift	160 kHz
<b>Nominal open-circuit sensitivity</b>	
at 250Hz	1 mV/Pa
<b>Dynamic range</b>	
Upper limit (3% distortion)	174 dB re. 20 $\mu$ Pa
Thermal noise	44 dB(A) re. 20 $\mu$ Pa
<b>Effective front volume</b>	
Nominal at 250Hz	0.1 mm <sup>3</sup>
<b>Temperature range</b>	
	-30 °C to +70 °C
<b>Temperature coefficient (250 Hz)</b>	
-30 °C to +70 °C	0.01 dB/°C
<b>Static-pressure coefficient</b>	
250 Hz at 25 °C	-0.01 dB/kPa
<b>Output impedance</b>	
Typical	75 $\Omega$
<b>Humidity (non-condensing)</b>	
Range:	0 – 95 % RH
Influence (250Hz):	<0.1 dB (0 - 100% RH)

## Ordering Information

Included Items	Part Number
Blast Probe According to ANSI S12.42 (includes microphone and preamplifier in the probe housing, and a travel case)	67SB
1.5 mm Hex key	YY0012
Calibration plug	GR1423
External Calibration Adapter	GR1462
Manual	LI0056

## Accessories

The following items are optional for the 67SB and can be ordered separately.

Item	Part Number
1-Channel LEMO Power Module with gain, filters, and SysCheck generator	12AK
3 m LEMO extension cable	AA0008
10 m LEMO extension cable	AA0009
Intelligent Pistonphone	42AP

## Calibration

Before leaving the factory, all G.R.A.S. products are calibrated in a controlled laboratory environment using traceable calibration equipment. We recommend a yearly recalibration at minimum, depending on the use, measurement environment, and internal quality control programs. We recommend calibration prior to each use to ensure the accuracy of your measurements.

## Warranty

All G.R.A.S. products are made of high-quality materials that will ensure life-long stability and robustness. The 67SB is delivered with a 5-year warranty. Damaged diaphragms in microphones can be replaced. The warranty does not cover products that are damaged due to negligent use, an incorrect power supply, or an incorrect connection to the equipment.

## Service and Repairs

All repairs are made at G.R.A.S. International Support Center located in Denmark. Our Support Center is equipped with the newest test equipment and staffed with dedicated and highly skilled engineers. Upon request, we make cost estimates based on fixed repair categories. If a product covered by warranty is sent for service, it is repaired free of charge, unless the damage is the result of negligent use or other violations of the warranty. All repairs are delivered with a service report, as well as an updated calibration chart.

Manufactured to conform with:

CE marking directive:  
93/68/EEC



WEEE directive:  
2002/96/EC



RoHS directive:  
2002/95/EC



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