



PISTON ON A SPHERE SETUP

POS

PISTON ON A SPHERE

PU calibration in non- anechoic environment

Direct calibration based on a pressure reference microphone and a known response loudspeaker.

Calibration of particle velocity sensors is not a straight forward process as there are no reference particle velocity sensors to compare with.

This methodology allows calibration of this quantity in comparison with a reference microphone sensor. The relation of both quantities is obtained by means of a vibrating membrane enclosed in a close cavity.

The calibration process is not directly straightforward, requiring some user feedback. For this reason it is only recommended to be used as a calibrator by very experienced users. Less experienced users are recommended to use the POS as a response checker.

I. PISTON ON A SPHERE

WORKING PROCEDURE

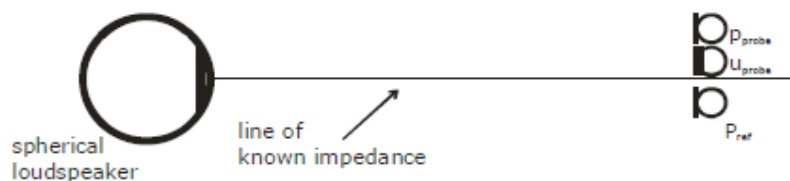
The piston on a sphere calibrator is suitable for all “normal” range MicroflowN Probes, making able to calibrate both, the pressure and the particle velocity sensors.

The system is based on a Loudspeaker (piston) mounted inside sphere and a reference pressure sensor which response is compared to the particle velocity response thanks to the relation of pressure and velocity by means of acoustic impedance.

By combining two calibration steps the response of the sensors can be checked from 20 Hz-10 KHz, obtaining the fitted model.

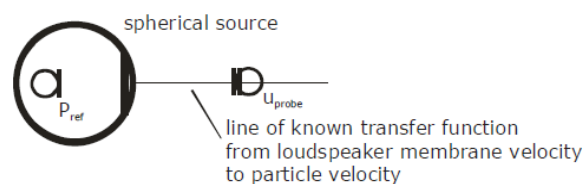
HIGH FREQUENCY CALIBRATION METHOD:

Known relation between reference pressure sensor and particle velocity sensor in the line via acoustic impedance:

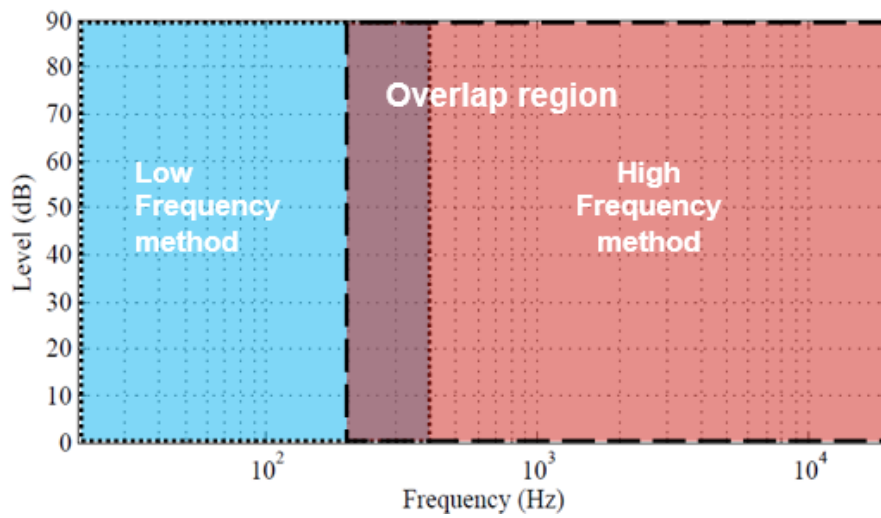


LOW FREQUENCY CALIBRATION METHOD:

Reference sensor measures the variations of pressure inside the sphere produced by the diaphragm movements, measured by the particle velocity sensor.



Only applicable to low frequencies, until the first mode of the sphere. Both results are overlapped to obtain the full bandwidth calibration



The calibration process and procedure is susceptible to errors because of:

- Probe and reference sensor allocation
- Reference sensor response variation
- Difficult assessment of the proper noise level
- Complicated model fitting criteria



Therefore it is recommended to use the POS calibrator as a checkup tool and not as an actual calibrator.

Every Microflown sensor should be recalibrated by Microflown Technologies staff every 2 years.

II. COMPATIBLE PROBES

All Microflow probes are compatible with the Piston on a sphere calibrator.

III. COMPATIBLE FRONTENDS

Frontend	Nr. Channels	Max Fs (KHz)	Bits	IEPE
	Input	Output		
Scout422	4 analog inputs 1 tachometer input 1 trigger input	1 amplified output 1 analog output	52	24 Yes
				
DIC24	24 input, expandable	350 Hz to 50 kHz	24 bits	yes
				

IV. SYSTEM COMPONENTS

SPHERE LOUDSPEAKER

PROBE HOLDER

REFERENCE MICROPHONE HOLDER(@
HIGH FREQUENCY POSITION)

REFERENCE MICROPHONE HOLDER(@ LOW
FREQUENCY POSITION)

CALIBRATION SW



Figure 1. POS items

Needed but NOT included items:

- Reference microphone (REF-MIC)
- Scout 422/ Maya 44/Maya 44 + frontend

V. SYSTEM CHARACTERISTICS

Parameter	Value	Unit/ note
Physical		
Weight	1	Kg
Distance probe-membrane (high freq. position):	230	mm
Distance probe- membrane (low freq. position)	0	mm
Loudspeaker characteristics		
Exited frequency range	80-20000	Hz
Electrical impedance	8	Ohms
S/N	> 95	dB
Max SPL	111	dB
Probe holder		
Size	½	inch
Connector sphere- frontend	BNC	

VI. USAGE AND PRECAUTIONS



- Do not submerge the electronics in water as this will lead to permanent damage.
- Only use the cables supplied with the kit. Any modifications to these cables or the use of cables of a different brand or type may result in permanent damage to the probes or the rest of the electronics.
- Microflown sensor calibration with POS setup needs to be performed in a quiet environment with low reflections but anechoic conditions are not required.
- The reference microphone is not included in the package but it should comply with the following specifications: Random incidence and ½ inch. Preferable the one provided by Microflown as REF-MIC.

VII. TECHNICAL SUPPORT

For any problem or doubt with your equipment, please contact Microflown™ Technologies Customer service:

- Mail: cs@microflown.com
- Skype: cs.microflown
- Telephone: +31(0) 88 001 08 11 Monday to Friday, from 9:00 to 17:00 (UTC+1).

VIII. WARRANTY POLICY, REPAIRS AND REPLACEMENTS

WARRANTY AND REPLACEMENT OR SUBSTITUTION

During the first two years (24 months) the seller offers a warranty on all its products, except for trading items and third party manufactured items. The seller warrants that all products will be free from defects in materials and workmanship for this period of two years. During this two year period, the seller will repair or replace defect products free of charge. Products damaged by accident, abuse, misuse, natural disaster or by any unauthorized disassembly, repair or

modification are not covered by this warranty. The incurred transportation costs of returning the products to seller will be borne by the buyer. The logistical cost for returning the products back to the buyer will be borne by the seller. Several products come with a “VOID if seal is broken” sticker, the warranty is void at all times when this sticker is broken.

GRACE PERIOD (YEAR 3 AND 4)

During the third and fourth year the seller offers a grace period. In the grace period the products purchased at an earlier date can be replaced by completely new state of the art products of the same scope of the original purchase. This applies only for the products known as standard probes and signal conditioners. In the first year of the grace period, (year 3) customers have an option to replace their products for 25 % of the actual ex works end-user price. The full freight and packaging charges apply.

In the second year of the grace period, (year4) customers have an option to replace their products for 50 % of the actual ex works end-user price. The full freight and packaging charges apply.

The new products are accompanied by a new warranty. Both the two years warranty and grace period become applicable again from the date of invoice.

REPAIRS OUTSIDE WARRANTY POLICY

Replaced/repaired parts come with a six month warranty under the same conditions as the two year warranty.