

## FEATURES

- Pressure chamber with clamping platform
- Sealed feed-through for ¼” microphone
- Pneumatic excitation of small diaphragms

## APPLICATION

- Passive excitation of micro-speaker, headphone, tweeter and microphone suspension parts
- Determine linear and nonlinear membrane parameters using the MSPM Lite/Pro module
- Perform 3D scans of a bare membrane without motor, using SCN



## DESCRIPTION

The MSPM-Bench (Micro Suspension Part Measurement) is designed for the measurement of the linear and nonlinear mechanical parameters of small suspension parts (micro-speakers, headphones, tweeters, microphones).

The bench is designed as a small pressure chamber for generating high sound pressures in order to excite a clamped, small diaphragm. Using a displacement sensor, the resulting vibration is measured. The sealed outlet allows the measurement of the sound pressure in the chamber directly, by using a microphone.

Item number

#2500-604

## CONTENT

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## 1 Components of MSPM Bench


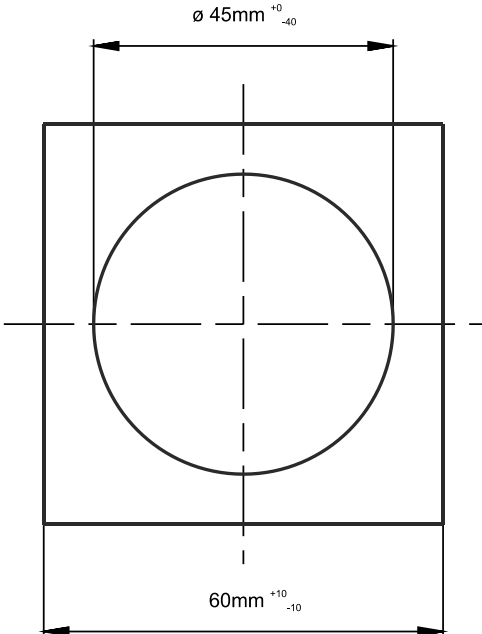
### 1.1 MSPM Bench Set

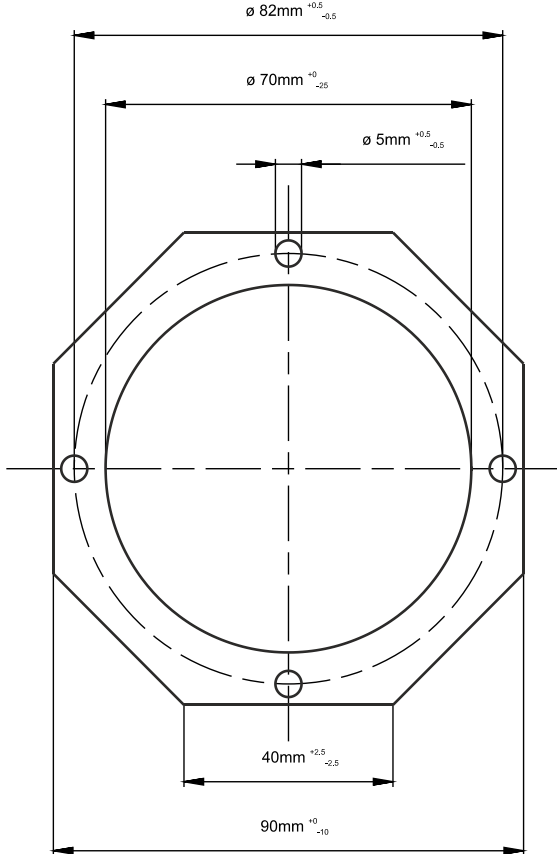
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|-------------------------|--|
| <b>MSPM Bench</b>       | Hardware for the measurement of small suspension parts (micro-speakers, headphones, tweeters and microphones). |
| <b>MSPM Bench Inlay</b> | Inlay for the pressure chamber to reduce the air volume and to increase the possible sound pressure.           |
| <b>Loudspeaker</b>      | Loudspeaker driving the pressure chamber.  |

### 1.2 Additional Components required


|                     |  |
|---------------------|--|
| <b>Microphone</b>   | A 1/4" microphone is required for sound pressure measurement in the pressure chamber.<br><b>Recommended Product:</b> MIC 40PP-10-S1 (Item # 2400-360)  |
| <b>Laser Stands</b> | The MSPM Bench is designed to work with one of the following laser positioning devices <ul style="list-style-type: none"> <li>• 3D Scanner (Scanning Vibrometer System SCN) (Item #:2510-001)</li> <li>• LST Bench (Item #: 2500-310) + Translation Stage</li> <li>• Pro Driver Stand (Item #:2211-002) + Translation Stage</li> </ul> |

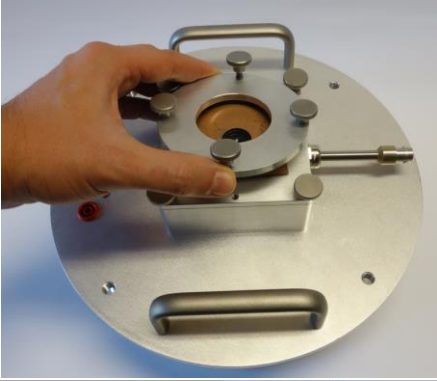
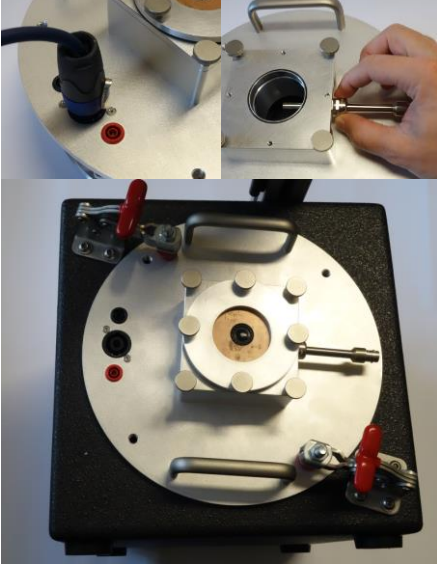
### 1.3 Device Under Test

|  |  |
|--|--|
| <p><b>DUT Carrier</b></p> <p>The size of the supported diaphragms depends on the used clamping adapter.</p> <p>Using the standard clamping, diaphragms with a diameter up to 45 mm; using the extended clamping, diaphragms up to 70 mm can be mounted on the MSPM Bench.</p> <p>The diaphragm should be clamped or glued onto a custom made, stiff carrier plate. Materials such as plastic, metal, epoxy, etc. may be used. The plate can be up to 3 mm thick.</p> |   |
| <p><b>Standard Clamping</b></p> <p>The width/length of the rectangular panel should be between 50 mm and 70 mm. A ring with inner diameter of 45mm is used to press the panel on a sealing ring.</p>   |  |


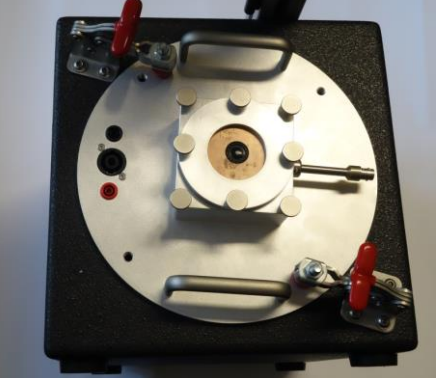
|                          |   |   |
|--------------------------|---|---|
| <p>Extended Clamping</p> | <p>The outer dimension of the panel should be between 75mm and 80mm. A ring with inner diameter of 70mm is used to press the panel on a sealing ring.</p> |  |
|--------------------------|---|---|

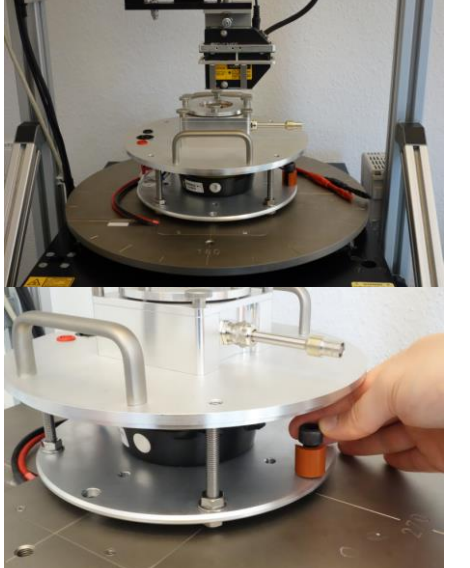
2 Preparing a Measurement

|                             |   |  |
|-----------------------------|---|--|
| <p>Remove Clamping Ring</p> | <p>Unscrew the clamping ring and remove it from the enclosure. Place the DUT carrier on the platform.</p> |  |
|-----------------------------|---|--|

|                                   |   |   |
|-----------------------------------|---|---|
| <p><b>Clamp the DUT</b></p>       | <p>Fix the DUT on the bench by attaching the clamping ring with 4 screws.</p>   |   |
| <p><b>Prepare the Sensors</b></p> | <p>Insert and connect the microphone, fix the outlet. Connect the speaker input to the analyzer.</p> <p>Place the MSPM bench on one of the compatible laser positioning devices (e.g., <i>LST Bench</i>).</p> <p>Direct the laser beam to the center of the membrane. A white dot may be required on the membrane to improve reflection. Adjust the laser position so that the laser is in its center position.</p> |  |

### 3 Using Different Laser Stands

|                                |   |  |
|--------------------------------|---|--|
| <p><b>Pro Driver Stand</b></p> | <p>Clamp the MSPM Bench on the screws between the platforms or on the lower platform into the Pro Driver Stand.</p> |  |
| <p><b>LST Bench</b></p>        | <p>Place the MSPM Bench on the LST Box and use the fast clamps to fix the setup</p>                                 |  |

|                                   |   |  |
|-----------------------------------|---|--|
| <p><b>Laser Scanner (SCN)</b></p> | <p>Place the MSPM Bench on the turntable and connect the driving speaker with the speaker clamps. Adjust the laser using the motor controller.</p> <p>Mount the MSPM bench to the turntable, using the included M10 screws.</p> |  |
|-----------------------------------|---|--|

### 4 Limits

| Parameter                | Conditions                                | Min | Typ | Max        | Unit                             |
|--------------------------|---|-----|-----|------------|----------------------------------|
| <b>DUT</b>               |   |     |     |            |                                  |
| <b>DUT Carrier Plate</b> |   |     |     |            |                                  |
| Dimensions (W/L)         |   | 50  | 60  | 80         | mm                               |
| Thickness                |   |     |     | 3          | mm                               |
| <b>Diaphragm</b>         |   |     |     |            |                                  |
| Diameter                 |   |     |     | 70         | mm                               |
| Resonance frequency      |   | 100 |     | 2500       | Hz                               |
| <b>MSPM CLAMPING SET</b> |   |     |     |            |                                  |
| <b>Operation</b>         |   |     |     |            |                                  |
| Maximum SPL              | continuous (< 40 s)<br>short-term (< 5 s) |     |     | 156<br>160 | dB (re 20 µPa)<br>dB (re 20 µPa) |
| Input voltage            | continuous (< 40 s)<br>short-term (< 5 s) |     |     | 12<br>19   | V<br>V                           |
| <b>Dimensions</b>        |   |     |     |            |                                  |
| width                    |   |     | 250 |            | mm                               |
| height                   |   |     | 150 |            | mm                               |
| weight                   |   |     | 4.5 |            | Kg                               |

### 5 Sealing Rings

| Item   | Quantity | Position  |
|--|----------|---|
| <b>MSPM Bench rev. &gt;= 1.1 incl.</b>                                   |          |   |
| <ul style="list-style-type: none"> <li>Sealing Ring 72 x 1 mm</li> </ul> | 2        | <ul style="list-style-type: none"> <li>between Extended Lower Clamping and DUT Carrier</li> <li>1x spare</li> </ul>   |
| <ul style="list-style-type: none"> <li>Sealing Ring 53 x 1 mm</li> </ul> | 3        | <ul style="list-style-type: none"> <li>between Support and Enclosure</li> <li>between Enclosure and Standard Lower Clamping</li> <li>between Enclosure and Extended Lower Clamping</li> </ul> |
| <ul style="list-style-type: none"> <li>Sealing Ring 47 x 1 mm</li> </ul> | 2        | <ul style="list-style-type: none"> <li>between Standard Lower Clamping and DUT Carrier</li> <li>1x spare</li> </ul>   |
| <ul style="list-style-type: none"> <li>Sealing Ring 42 x 1 mm</li> </ul> | 1        | <ul style="list-style-type: none"> <li>between Enclosure and Volume Reducer</li> </ul>  |

|  |                            |   |
|--|----------------------------|---|
| <p><b>MSPM Bench rev. = 1.0 incl.</b></p> <ul style="list-style-type: none"> <li>• Sealing Ring 53 x 1 mm</li> <li>• Sealing Ring 47 x 1 mm</li> <li>• Sealing Ring 42 x 1 mm</li> </ul> | <p>2</p> <p>2</p> <p>1</p> | <ul style="list-style-type: none"> <li>• between Support and Enclosure</li> <li>• between Enclosure and Standard Lower Clamping</li> <li>• between Standard Lower Clamping and DUT Carrier</li> <li>• 1x spare</li> <li>• between Enclosure and Volume Reducer</li> </ul> |
|--|----------------------------|---|

## 6 Sealing Ring Replacement Sets

| Item   | Quantity                            | Item-Nr. / Position  |
|--|-------------------------------------|--|
| <p><b>For MSPM Bench rev. &gt;= 1.1</b></p> <ul style="list-style-type: none"> <li>• Sealing Ring 72 x 1 mm</li> <li>• Sealing Ring 53 x 1 mm</li> <li>• Sealing Ring 47 x 1 mm</li> <li>• Sealing Ring 42 x 1 mm</li> </ul> | <p>3</p> <p>1</p> <p>3</p> <p>1</p> | <p><b>Item-Nr.: 2500-622</b></p> <ul style="list-style-type: none"> <li>• between Extended Lower Clamping and DUT Carrier</li> <li>• between Enclosure and Std. or Ext. Lower Clamping</li> <li>• between Standard Lower Clamping and DUT Carrier</li> <li>• between Enclosure and Volume Reducer</li> </ul> |
| <p><b>For MSPM Bench rev. = 1.0</b></p> <ul style="list-style-type: none"> <li>• Sealing Ring 53 x 1 mm</li> <li>• Sealing Ring 47 x 1 mm</li> <li>• Sealing Ring 42 x 1 mm</li> </ul>                                       | <p>1</p> <p>3</p> <p>1</p>          | <p><b>Item-Nr.: 2500-621</b></p> <ul style="list-style-type: none"> <li>• between Enclosure and Standard Lower Clamping</li> <li>• between Standard Lower Clamping and DUT Carrier</li> <li>• between Enclosure and Volume Reducer</li> </ul>  |

Find explanations for symbols at:

<http://www.klippel.de/know-how/literature.html>

Last updated: September 20, 2022

