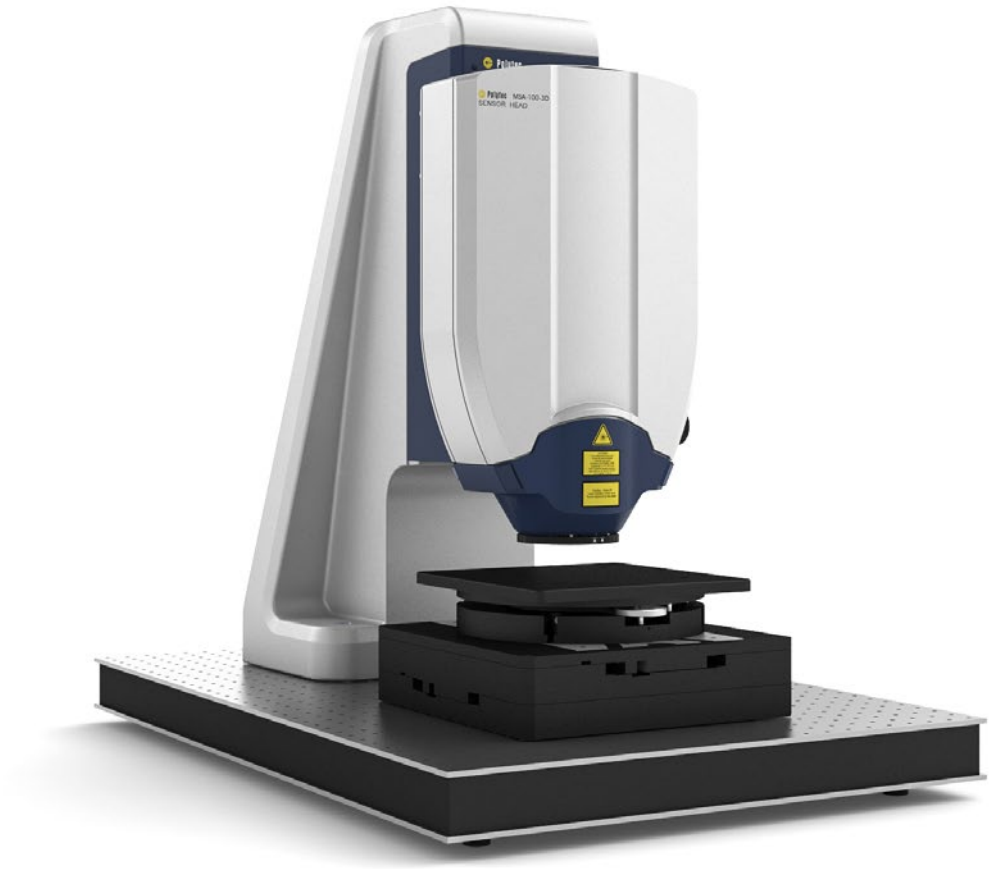
## MSA-100-3D Micro System Analyzer

Complex motion patterns of micro structures as MEMS, precision mechanics and biological systems require acquisition and analysis of the complete motion vector with high resolution both for out-of-plane and in-plane components. The MSA-100-3D effectively meets this requirement by a revolutionary new approach in laser Doppler vibrometry deriving genuine real-time 3D vibration data in one common data set.

Two configurations of the Micro System Analyzer are available. The MSA-100-3D measures 3D vibration data on spot locations. The MSA-100-3DSV features a software-controlled high-precision XY stage and allows automated full-field scanning measurements. Meaningful visualization of 3D deflection shapes and extensive data analysis is provided by Polytec's PSV Software.



**Highlights**

- Real-time measurement with high bandwidth
- Sub-pm displacement resolution reveals important details
- Single-point and full-field scanning measurements
- Frequency range up to 25 MHz
- Small spot size of <4 µm for high lateral resolution
- Large stand-off distance
- Probe station compatible

# MSA-100-3D Micro System Analyzer

3D vibration measurement
for MEMS & microsystems
Datasheet

# Technical data

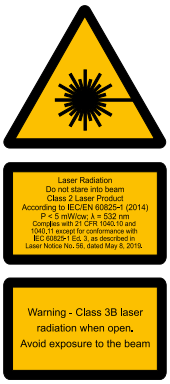
| Principal configurations | MSA-100-3D Single-Point 3D Vibrometer | MSA-100-3DSV Scanning 3D Vibrometer |
|---|---|---|
| Sensor head unit | ■ Microscope optics for best lateral resolution with spot size <4 µm<br>■ Integrated LED sample illumination | |
| Front-end unit / Data management system | Installed in a system cabinet for 19" electrical equipment:<br>■ MSA-F-100-3D Vibrometer front end with digital decoder technology<br>■ MSA-W-100-3D Data Management System | |
| Stand (optional) | ■ A-STD-BAS-02 Base Stand to mount on optical table or breadboard with 100 mm travel range<br>■ A-STD-TST-01 Test Stand enables autofocus functionallity with 200 mm travel range | |
| Prober compatibility | Compatible to manual, automatic and vacuum probestations | |
| xy Stage | Manual stage (optional) | A-PST-220 XY Precision Positioning Stage:<br>■ Travel range: 200 mm x 200 mm<br>■ Tip/tilt adjustment<br>■ Bi-directional repeatability: +/- 0.5 µm<br>■ Load capacity: 10 kg |
| Software | VibSoft-1004 Software Package for data acquisition and analysis | PSV Scanning Vibrometer Software for data acquisition and analysis |

| Sensor head unit | |
|---|---|
| Configuration | Single measurement beam, three direction sensitive detectors |
| Laser source | DPSS, 532 nm, visible green laser beam |
| Laser output power | <5 mW visible output power |
| Laser safety class | Class 2 |
| Stand-off distance | 36,7 mm |
| Spot diameter | <4 µm |
| Depth of focus | ±10 µm |
| Weight | 12.5 kg |
| Camera | ■ Two integrated digital cameras for displaying measurement and large overview area<br>■ MAIN (measurement area): field of view ($mm^2$) = 0.94 x 0.71, resolution (px) = 1,296 x 966<br>■ AUX (overview area): field of view ($mm^2$) = 3.7 x 2.7, resolution (px) =782 x 582 |

| Front-end configurations | MSA-100-3D-H[1] | MSA-100-3D-M | MSA-100-3D-V[1] |
|---|---|---|---|
| $f_{max}$ | 100 kHz | 2.5 MHz | 25 MHz |
| Number of ranges | 13 velocity ranges | 13 velocity ranges | 13 velocity ranges |
| $v_{max}$ | 0.001 m/s ... 10 m/s, range dependent | 0.001 m/s ... 10 m/s, range dependent | 0.001 m/s ... 10 m/s, range dependent |
| Velocity resolution, average value[2] | 0.01 (µm/s)/√Hz ... 0.02 (µm/s)/√Hz range dependent, frequency dependent | 0.005 (µm/s)/√Hz ... 1 (µm/s)/√Hz range dependent, frequency dependent | 0.005 (µm/s)/√Hz .... 2 (µm/s)/√Hz range dependent, frequency dependent |

| General specifications | |
|---|---|
| Power consumption | 100 VAC ... 240 VAC ±10%, 50/60 Hz; overall max. 825 W |
| Environmental conditions | Operating temperature: +18 °C ... +28 °C (64.4 °F ... 82.4 °F);<br>Storage temperature: –10 °C ... +65 °C (14 °F ... 149 °F);<br>Relative humidity: max. 80%, non-condensing |

For available accessories visit our website www.polytec.com




[1] Also combined systems MSA-100-3D-HV available

[2] Averaging is performed over the maximum bandwidth $f_{max}$ of the respective range

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2023/07 - Technical specifications are subject to change without notice