

MSA-050 Micro System Analyzer

The MSA-050 Micro System Analyzer measures vibrations on small parts and microsystems with high precision. Its non-contact principle of operation leaves samples completely undisturbed, producing accurate data even when measuring very small and sensitive objects. Polytec's Scanning Vibrometer Software is the well established backbone of the system providing simple operation and clear animations of measurement results.

The MSA-050 comprises a compact stand with manually actuated z-axis and a digital single point vibrometer. For full-field measurements the integrated xy-stage traverses the sample under software control.

A 19" rack contains the complete electronics of the MSA-050 Micro System Analyzer.



Highlights

- High-resolution vibration analysis up to 2 MHz bandwidth
- Non-contact and fast measurement
- Simple operation with proven PSV software
- Meaningful animations of measurement data
- Large and flexible working space

MSA-050 Micro System Analyzer

Full-field vibration measurement
on small components

Datasheet



Technical data



Optical specifications

Laser type	Helium Neon (HeNe)
Laser protection class	Class 2, <1 mW
Laser wavelength	633 nm, visible red beam

Video camera (integrated in sensor head)

Camera type	1/4" CCD color board camera
Active pixels (H x V)	510 x 492

Configuration ¹	Standard sensor with VIB-A-10xLENS 10x microscope objective	Standard sensor with VIB-A-20xLENS 20x microscope objective (Option)
Working distance	37.3 mm	21.7 mm
Laser depth of field	0.048 mm	0.012 mm
Spot diameter	3.0 µm	1.5 µm
Camera field of view	1.36 x 1.04 mm	0.68 x 0.52 mm

Specifications of motion axes

Component	A-STD-BAS-01 Base Stand with z-axis	A-PST-050S XY Positioning Stage
Traversing range	150 mm manually actuated with coarse and fine drive	50 x 50 mm motorized, software-controlled
Resolution	-	0.25 µm
Bidirectional repeatability	-	2.0 µm
Tip/tilt	-	+/- 2 ° manually actuated

Vibrometer performance specifications

Decoder	Digital velocity decoder	Digital displacement decoder (Option)
Number of ranges	8	16
Measurement ranges	5 ... 1,000 mm s ⁻¹ /V	0.05 ... 5,000 µm/V
Full-scale output	0.05 ... 10 m/s (p) ²	1 ... 100,000 µm (p-p) ³
Max. decoder frequency	100 kHz ... 2.5 MHz ⁴	2.5 MHz ^{4,5}
Resolution	0.02 ... 0.7 µm s ⁻¹ /√Hz (typical) ⁶	0.015 ... 1,500 nm ⁷
Max. acceleration	3,200 ... 16,000,000 g	-

¹ Additionally, the MSA-050 can be operated w/o microscope objective. The standard sensor features variable focus providing maximum flexibility in possible settings.

² The full-scale values correspond to the maximum output voltage of 10 V_{peak}.

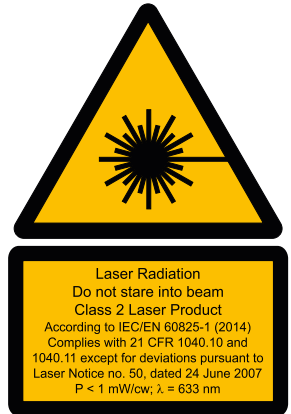
³ The full-scale values correspond to ±10 V (peak-to-peak) maximum output voltage.

⁴ The bandwidth of the MSA-050 is restrained to 1/2 MHz (without/with PSV-S-BW2M option) by the data acquisition.

⁵ When a suitable measurement range has been selected for the digital velocity decoder.

⁶ The noise-limited resolution is defined as the signal amplitude (rms) at which the signal-to-noise ratio is 0 dB with 1 Hz spectral resolution, measured on 3M Scotchlite Tape® (reflective film). The typical value refers to the center of the operating frequency range.

⁷ The resolution corresponds to the quantization step of approx. 0.4 mV at the analog output.





General specifications		
System component	A-STD-BAS-01 Base Stand with A-PST-050S Standard Positioning Stage	A-CAB-BAS System Cabinet containing <ul style="list-style-type: none">• NLV-2500-5 Laser Vibrometer• MSA-E-050 Junction Box• A-CTR-110 Axis Controller• PC-I Industrial PC
Dimensions [L x W x H]	485 x 410 x 594 mm	555 x 630 x 645 mm
Weight	22 kg	70 kg
Power	100 VAC ... 240 VAC \pm 10%, 50/60 Hz, max. 700 VA	
Ambient temperature	+5 °C ... +40 °C (41 °F ... 104 °F)	
Storage temperature	-10 °C ... +65 °C (14 °F ... 149 °F)	
Relative humidity	max. 80%, non-condensing	
Optical cable length	3 m (Vibrometer Controller to Sensor Head)	

Data acquisition hardware	
Input channels	2
Resolution	12 ... 16 bit (depending on bandwidth)
Input voltage range	+/-200 mV ... +/-10 V
Trigger	External trigger (TTL) or trigger to analog reference signal
FFT frequency range	DC ... 1 MHz DC ... 2 MHz (Option)
Specimen excitation	Internal signal generator - up to 500 kHz - output voltage max. +/- 10V

Accessories	
Digital Displacement Decoder (Option)	Additional vibrometer decoder delivering high resolution displacement signals.
VIB-A-10xLENS Microscope Objective (Standard)	10x Microscope objective providing a laser spot diameter of 3 μ m at 37.3 mm stand-off distance.
VIB-A-20xLENS Microscope Objective (Option)	20x Microscope objective providing a laser spot diameter of 1.5 μ m at 21.7 mm stand-off distance.
VIB-A-510 Illumination Module (Option)	LED light source providing coaxial illumination of the test object. For use with microscope objectives.
A-JST-0001 Joystick (Option)	Joystick for convenient manual control of XY Positioning Stage.


PSV Software Options

PSV-S-BW2M Bandwidth Extension ⁷	Extends the acquisition bandwidth to 2 MHz. Standard acquisition bandwidth is 1 MHz.
PSV-S-FFTEXT FFT Resolution ⁷	Extends the number of FFT lines up to 819,200. Standard is 128,000 FFT lines.
PSV-S-SIG-M Signal Generator ⁸	Internal arbitrary signal generator for vibration excitation.
PSV-S-APS APS Professional ⁷	Advanced definition of measuring grids by drawing geometrical shapes as well as individual measurement point manipulation.
PSV-S-SIGPRO Signal Processor ⁷	User interface to the math library included in the PSV software, designed as an easy-to-use spreadsheet.
PSV-S-TDD Time Domain Animation ⁷	Time domain data are acquired while scanning. Allows for “slow motion” animation e.g. of surface waves propagation or switches.
PSV-S-EXPME Data Export ME'scope ⁷	Data export to Vibrant's ME'scope modal analysis software.
PSV-S-EXPUFF Data Export UFF ⁸	Data export to Universal File Format (UFF).
PSV-S-VBENG Macro Programming ⁸	SAX Basic Engine: Visual Basic® for Applications (VBA) compatible. Allows automation of test routines.

PSV Software Maintenance

PSV-S-SM-B Basic Software Maintenance ⁸	Free PSV Software updates for a duration of 1 year.
PSV-S-SM-1 Extended Software Maintenance ⁷	Entitles for software updates for an additional period. Available in 12 month increments.
PSV-S-SM-UNI University Program ⁷	Entitles universities and educational institutes for updates of the software package purchased with the measurement system. New releases of the software are provided free of charge during the lifetime of the system.

⁷ Option
⁸ Standard

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