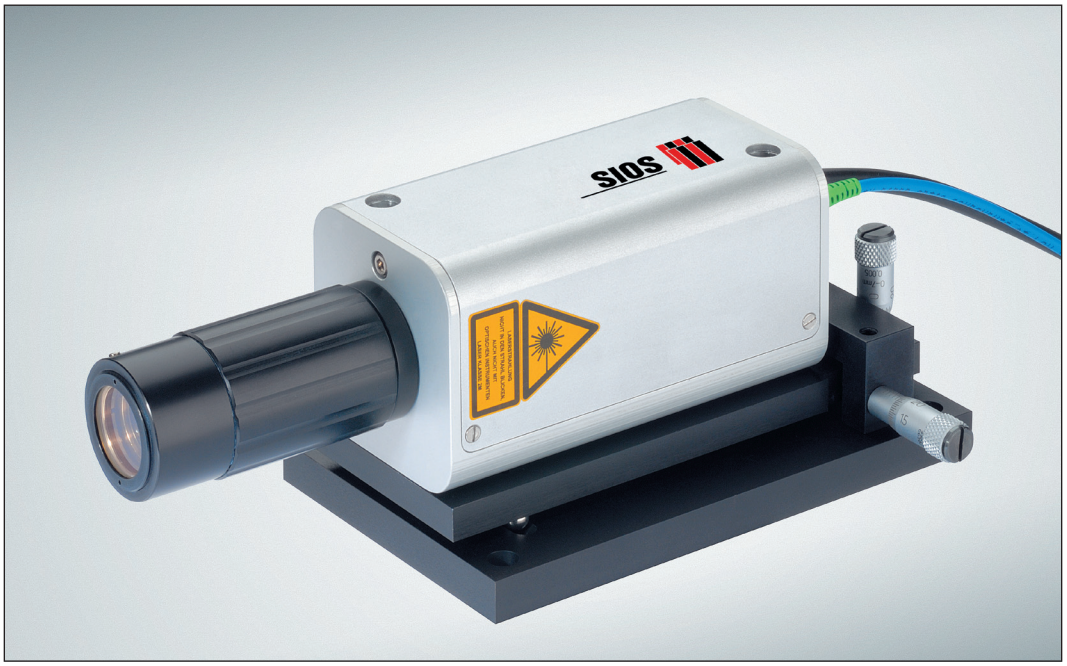
Laserinterferometric Vibrometer



LSV-Series

SIOS Meßtechnik GmbH

Design and Operation

The laser-interferometric vibrometer is used to measure precisely and without contact the change of position over time of an object or a surface with any degree of roughness. It can measure mechanical vibrations in the range from 0 to 5 MHz with a resolution in the subnanometer range.

The design of the devices is based on the proven concept of the SP-S series laser-interferometric vibrometers. LSV-series vibrometers have an integrated objective that can set the working distance continuously from a few centimeters up to several meters.

The complete system consists of the modular electronic unit with an in-built HeNe laser, the compact sensor head connected by a fiber-optic cable, and a number of interfaces.

The fiber-coupled vibrometer converts the measuring movement in the direction of the optical axis into an interference signal. This is transmitted to a high-resolution electronic demodulator, where it is evaluated. Operation and display take place on a PC with special software, which also provides an amplitude-frequency spectrum by means of an FFT transformation.

Technical Data LSV 2500

Working distance from sensor head: (continuously selectable)	240 mm - 2500 mm
Coherence maxima:	240 mm + n·240 mm, n=0,1,2...
Measurement range: (dependent on surface)	≤ ± 20 mm
Wavelength:	632.8 nm
Surface roughness:	arbitrary
Translation rate:	1.5 m/s 3 m/s on request
Dimensions (L x W x H)	
• Sensor head:	[162 x 52 x 52] mm
• Sensor head + alignment base:	[195 x 100 x 73] mm
• Electronic signal-processing/ power-supply unit:	[450 x 400 x 150] mm
Mass:	
• Sensor head + alignment base:	1 kg
• Electronic signal-processing/ power-supply unit:	ca 8 kg
Cable length between sensor head and electronics unit :	3 m optionally up to 10 m
Line voltage / frequency:	100...240VAC /47...60Hz
Laser safety class according to EN 60825-1:2007 and ANSI Z136.1 (CDRH)	2M II

Software for Windows - INFAS Vibro

- Spectral analysis
- Digital filtering
- Data record length from 256 to 32768 values
- Calculation of speed and acceleration of the vibration movement
- Averaging of spectra
- Setting options for external triggering

Features

- Highly precise, non-contact vibration and length measurements
- Variable working distance
- Customer-specific expansions
- Fiber-optic cable coupling of the sensor head
- No thermal effects on the measurement environment
- Correction of environmental influences on the wavelength of the laser light
- Easy adjustment and handling
- Extensive trigger options
- Lateral motion of the rough measuring surface in relation to the measuring beam is only possible to limited extent
- FFT software for spectral analysis
- Open interfaces for OEM software under Windows and Linux

Digital data output – RE 10

High-speed evaluation card with buffered data output

- Number of interferometer channels: 4
- Resolution: 20 pm
- Measurable frequency range: 0 to 5 MHz
- Sampling frequency: up to 12.5 MHz
- External trigger input
- RS 232C interface
- USB interface

Digital data output – DP 10

Fast data recording in conjunction with a PC plug-in card

- Number of interferometer channels: 4
- Resolution: 20 pm
- Sampling frequency: up to 12.5 MHz
- High-resolution FFT analysis is possible
- Support for the INFAS Vibro software for NI-PCI 6534 and NI-PCIe 6535 PC cards

Analog data output – SM 05

- 7 length measuring ranges
- 16 bit resolution with output amplitudes up to ± 3 V
- Cutoff frequency: 2 MHz
- Continuous data output

Applications

- Non-contact measurement of the vibration of surfaces with any degree of roughness
- Determination of the vibration spectrum
- Determination of modes of vibration by spot sampling of the surface (hardware expansion required)
- Determination of the resonant frequencies of micro-objects and macroscopic components
- Multicoordinate measurements with multiple systems
- Highly precise length measurements

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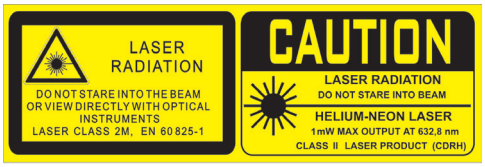

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