PSV-400 *Scanning Vibrometer*

POLYTEC SCANNING VIBROMETER

- PSV-400 Scanning Vibrometer
- PSV-400-3D Scanning Vibrometer
- MSV-400 Microscope Scanning Vibrometer
- PMA-400 Planar Motion Analyzer
- MMA-400 Micro Motion Analyzer

SCANNING & VISUALIZING VIBRATIONS

The completely redesigned PSV-400 Scanning Vibrometer represents state-of-the-art measurement technology for the analysis of structural vibrations. Entire surfaces are rapidly scanned and automatically probed with flexible and interactively created scan grids. The PSV-400 offers technical excellence, ease of use and features designed for resolving noise and vibration issues in the automotive, aerospace, commercial manufacturing and R&D markets.

Key Features of the PSV-400

- Easy and intuitive operation and rapid, non-contact vibration measurement
- Digital data decoding available (depending on system configuration)
- Measuring on imported object geometries or on interactively created scan grids
- Focus position of each sample point can be individually set
- Mountable rangefinder (optional) allows acquisition of geometry data
- MIMO (Principal Component Analysis)
- User-defined datasets enable extended and user-defined evaluation procedures
- Incorporates proven OFV-5000 Vibrometer Controller and OFV-505 Sensor Head technology
- Fully upgradeable to the PSV-400-3D 3D measuring Scanning Vibrometer

Measuring Vibrations of Complete Surfaces

Polytec Laser Doppler Vibrometers are used to precisely measure mechanical vibrations, quickly, easily and free from cross-talk or feedback problems. A modular design allows task specific optimization while retaining maximum flexibility and expandability for future needs.

Polytec Vibrometers operate on the Doppler principle, measuring the frequency shift of back-scattered laser light from a vibrating structure to determine its instantaneous velocity and displacement.

The PSV-400 Scanning Vibrometer is a single, automated, turnkey system that offers all the advantages of a laser vibrometer integrated with the speed, ease of use, accuracy and comprehensive data processing and visualization of a dual-axis laser scanner.

Users get a quick, easily understood and accurate visualization of a structure's global and local vibrational characteristics. The PSV-400 avoids the necessity of attaching a transducer array to the test sample and then individually collecting and processing each transducer's output.

The PSV-400 Scanning Vibrometer comprises both state-of-the-art hardware and software. It includes a compact sensor head with an integrated scanning unit, a vibrometer controller and a data acquisition and management system. These components are complimented by a powerful software package that controls the scanners, data processing, and visualization of the measurement results.

The PSV-400 series is built upon the combined strength of a proven OFV-5000 Controller and a high-performance OFV-505 Sensor Head featuring auto-focus and focus memory functionality.

The PSV-400 is designed to scan both small (mm^2) and large (m^2) structures. Depending on the chosen configuration, the PSV-400 covers vibration frequencies up to 20 MHz and vibration velocities up to 20 m/s.

The PSV-400 can be upgraded to the fully featured, 3-dimensional PSV-400-3D Scanning Vibrometer. It is also the base for the award-winning Polytec Microscanning Systems.

PSV-400 Technical Data

General Specifications	
Working distance	> 0.4 m (shorter distances accessible by using close-up unit*)
Laser wavelength	633 nm, visible beam
Laser protection class	Class II He-Ne laser, < 1 mW, eye-safe
Sample size	Several mm² up to m² range
Scan grid	Multiple grid densities and coordinate systems (polar, cartesian and hexagonal) each with up to 512 x 512 points combined in one scan

Configurations		
PSV-400-B	Basic Scanning Vibrometer	2 channels, 40 kHz, 10 m/s
PSV-400-H4	High End Scanning Vibrometer	4 channels, 80 KHz, 10 m/s
PSV-400-H4-S	High Amplitude Scanning Vibrometer	4 channels, 80 KHz, 20 m/s*
PSV-400-M2	Wide Bandwidth Dual Channel Scanning Vibrometer	2 channels, 1 MHz, 10 m/s
PSV-400-M4	Wide Bandwidth Four Channel Scanning Vibrometer	4 channels, 1 MHz, 10 m/s
PSV-400-M2-20	20 MHz Scanning Vibrometer	2 channels, 20 MHz, 10 m/s*

* available 2004

PSV-400 Hardware	
Sensor Head PSV-I-400	Components: - High sensitivity vibrometer sensor model OFV-505 - High precision scan unit (scanning range ± 20° about X, Y) Angular resolution < 0.002°, angular stability < 0.01° /hr - Color video camera with Auto Focus and 72x Zoom (4x digital, 18x optical) Features: - Scan speed > 100 points/s - Individual focusing of each scan point utilizing remote focus control with memory position function - Mountable rangefinder for acquisition of test sample geometry (optional)* - Working distance > 0.4 m (standard) - Weight 7.5 kg - Dimensions (L x H x W) 365 mm x 160 mm x 190 mm
Vibrometer Controller OFV-5000	- Velocity ranges: 2/10/50/100/1000 [mm/s/V] (PSV-400-B: 10/100/1000 [mm/s/V]; (PSV-400-M2-20: 5/25/125/1000 [mm/s/V]; further ranges dependent on the decoder configuration) - Bandwidth: 1.5 MHz (PSV-400-M2-20: 20 MHz) - Four analog low pass filters with limit frequency 5 kHz, 20 kHz, 100 kHz and 1.5 MHz resp. - RS 232 interface for remote control by the Data Management System
Junction Box PSV-E-400	Interface between PSV-I-400 Sensor Head, OFV-5000 Vibrometer Controller and the Data Management System - Input for 4 analog signals, triggers and gate available on BNC connectors, ICP-compatible - Output for signal generator available on BNC connectors
Data Management System PSV-W-400	State-of-the-art rack-mountable industrial PC equipped with: - DVD-Recorder - 17" LCD Display - 100 MB Ethernet network connection - Data acquisition: PSV-400-B 2 channels, 40 kHz bandwidth PSV-400-H4 4 channels, 80 kHz bandwidth PSV-400-H4-S 4 channels, 80 kHz bandwidth PSV-400-M2 2 channels, 1 MHz bandwidth PSV-400-M4 4 channels, 1 MHz bandwidth PSV-400-M2-20 2 channels, 20 MHz bandwidth - Signal generator - Operating system Windows® 2000 or Windows® XP (German, English and Japanese version available)
Systems cabinet, rollable (optional)	Houses PC Workstation, Vibrometer Controller, Junction Box and Data Management System
Motorized pan/tilt head (optional)	Maximum panning angle (horizontal): ± 90°, Maximum tilt angle (vertical): ± 84°

* available 2004

PSV-400 Software Features	
2D Alignment	- Simple and interactive procedure to align the coordinates of the video image to the coordinates of the scanners
Scan grid definition	Two alternatives: - Manual, interactive definition in the live video image by APS Professional (Advanced Point Selection), allows multiple grid densities and coordinate systems (polar, cartesian and hexagonal) each with up to 512 x 512 points combined in one scan - Data import from CAD- and FEM-systems via Universal File Format (UFF) or ASCII or binary from MEscope (optional)
Focus control	- Focus Scan and Focus Memory used to determine and save the optimum focus position of each respective scan point
Data acquisition	- Simultaneous data acquisition from up to 4 channels (vibrometer signal, 3 reference signals) - Acquisition modes: FFT; zoom-FFT (optional available except for B); fast scan (optional for B); multi frame (optional, only for H); time mode (optional) - Digital filtering and averaging available - Trigger options: external, analog, pre and post trigger
Data quality	Continuous assessment of the S/N ratio in order to improve data quality by Signal Enhancement (increased number of samples used for averaging) and Speckle Tracking
Target data	- Velocity is measured; displacement (calculated by integration of velocity) and acceleration (calculated by differentiation) can also be displayed - Data are saved in form of either spectra or time signal (optional for scan data) - Calculation of transfer functions between primary and reference signals: FRF, H1, H2, Coherence, Autopower, Crosspower
Data presentation	Spectral presentation: - Spectrum averaged over all scan points - Spectra of individual points Display of video image overlaid with measured data and various presentation modes of deflection shapes: - 2D: color map presentation of vibration data - 3D: 3-dimensional presentation of vibration data - Isolines: equivalent values are interconnected by colored isolines - Scan point: Each scan point is depicted as a square symbol colored according to the measured value Profile representation of section cuts across the test sample which are created interactively
Data export	- Windows® Automation Interface: Polytec FileAccess (enables data access utilizing Visual Basic or C++) - Export of geometry data, spectra, time signals and deflection shapes as UFF- and ASCII-file (Excel format), optional - Export of animated 2D- and 3D-models and profiles as AVI-file
Signal generation	The internal signal generator is used to create specific excitation signals

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