

PSV-500-3D Scanning Vibrometer

Polytec 3D Scanning Vibrometers are state-of-the-art for noise and vibration measurement in research and development. They determine operational deflection shapes and Eigenmodes for NVH, acoustics, structural dynamics, ultrasonics and FEM validation. The high frequency version extends the application range to non-destructive evaluation (NDE) research.

The versions H, M and HV cover different frequency ranges up to 25 MHz. Scanning heads equipped with the optional PSV Xtra technology deliver high fidelity data even at large stand-off distances or on uncooperative surfaces.



Highlights

- Non-contact laser measurement
- Full-field with high spatial resolution
- Open-minded PSV software with open data and control interfaces
- Expandable to fully automated RoboVib® Test Station
- Optional Xtra technology for improved SNR unveiling more details

PSV-500-3D Scanning Vibrometer

Full-field 3D vibration measurement

Datasheet



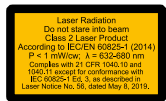
Technical data



PSV-500-3D – Standard scope of supply

	PSV-500-3D-H	PSV-500-3D-M	PSV-500-3D-HV
Vibrometer system & data acquisition	<ul style="list-style-type: none"> PSV-I-500 Scanning Head with high precision scanner, HD video camera and PSV-G-500 Geometry Scan Unit 2x PSV-I-520 Scanning Heads CoherenceOptimizer (Laser frequency stabilization) for all 3 scanning heads PSV-F-500 Front-End with 3 digital broadband decoders PSV-E-500 Junction Box 3x PSV-C-510 Main Cable, 10 m data acquisition and signal generator board installed in front-end 		<ul style="list-style-type: none"> PSV-E-530 Junction Box data acquisition and signal generator board installed in front-end (for H mode)
Computer	<ul style="list-style-type: none"> PSV-W-500 Data Management System: 19" industrial PC, wireless keyboard and mouse Microsoft® Windows® operating system and PSV software preinstalled 		
		<ul style="list-style-type: none"> data acquisition and signal generator board installed in PC 	<ul style="list-style-type: none"> data acquisition and signal generator board installed in PC (for V mode)
Accessories	<ul style="list-style-type: none"> PSV-A-014 System Cabinet: Workstation and storage for all standard accessories, integrated 24" TFT Monitor with swivel stand VIB-A-T02-S set of 3 tripods with tip-tilt head PSV-A-CL-VID Set of Close-Up Lenses for Video Camera Laser adjustment goggles Manuals 		

PSV-500 Scanning Heads		PSV-I-500/PSV-I-520 Scanning Head ¹	PSV-I-560/PSV-I-570 Scanning Head Xtra ²
Dimensions [W x L x H]	189 x 370 x 177 mm (7.44 x 14.57 x 6.97 in)		
Weight	PSV-I-500: 9.2 kg (20.3 lbs) with PSV-G-500 Geometry Scan Unit; PSV-I-520: 9 kg (19.8 lbs) PSV-I-560: 9.5 kg (20.9 lbs) with PSV-G-500 Geometry Scan Unit; PSV-I-570: 9.3 kg (20.5 lbs)		
Laser type, vibrometer	<ul style="list-style-type: none"> ■ Measuring laser: HeNe, wavelength 633 nm (red), Laser power <1 mW ■ Measuring laser: wavelength 1,550 nm (invisible), Laser power <10 mW ■ Pilot laser ³: wavelength 520 nm (green), Laser power <1 mW 		
Laser type, PSV-G-500 Geometry Scan Unit	Wavelength 670 nm +/- 5 nm (red); Laser power <1 mW		
Laser safety class	Class 2		
Working distance	125 mm ... ~100 m (PSV-G-500 Geometry Scan Unit: 250 mm ... 30 m)		
Scan angle [h x v]	50° x 40°		
Scanner properties	Angular resolution <0.001°, Angular stability <0.001°/h, max. 30 scan points/s		
Sample size	From a few mm ² up to several m ²		
Camera	HD format, 30x optical zoom, max. field of view [h x v] 64° x 38°		
Interfaces, electrical	Multi-pin bayonet connector, DIN plug for pan/tilt head control or external scanner control		
Interfaces, mechanical	Hexagon type tripod adapter for VIB-A-T02, 2x M6 thread		



¹ Standard

² Option

³ Diameter pilot laser corresponds to diameter measuring laser. Misalignment between measuring laser and pilot laser typ. <0.03°.

PSV-F-500 Front-End	
Dimensions [W x D x H]	485 x 380 x 150 mm (19", 84HP/3U)
Weight	~10 kg (~22 lbs)
Protection class	IP-20
Interfaces, electrical	Front: BNC connectors for reference channels, signal generator, trigger; Rear: multi-pin bayonet connector for main cable, monitor velocity output (PSV-500-3D-H only), RJ45 Ethernet to computer
Interfaces, mechanical	19" Rack mount adapters



PSV-E-500 Junction Box

Dimensions [W x D x H]	485 x 60 x 150 mm (19", 84HP/3U)
Weight	~8 kg (~17.6 lbs)
Protection class	IP-20
Interfaces, electrical	4x multi-pin bayonet connector for 3 umbilical cables and interconnection to PSV-F-500 Front-End, main cable, RJ45 Ethernet to computer
Interfaces, mechanical	19" Rack mount adapters

PSV-E-530 Junction Box (PSV-500-3D-HV only)

Dimensions [W x D x H]	485 x 320 x 44.5 mm (19", 84HP/1U)
Weight	1.1 kg (2.4 lbs)
Protection class	IP-20
Interfaces, electrical	Front: BNC connector for 1 reference channel, signal generator, trigger Rear: connector for vibrometer channel and to data acquisition to PC
Interfaces, mechanical	19" Rack mount adapters

PSV-A-014 System Cabinet

Dimensions [W x D x H]	580 x 1330 x 845 mm
Weight	186 kg (incl. front-end, PC, monitor, scanning heads and cable)

General specifications

Power	100 VAC ... 240 VAC \pm 10 %, 50/60 Hz; 600 VA (typical)
Environmental conditions	Operating 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
Calibration	Every 24 months (recommended)

Compliance with standards

Electrical safety	IEC/EN 61010-1
	IEC/EN 61326-1 Emission: FCC Class A, IEC/EN 61000-3-2 and 61000-3-3 Immunity: IEC/EN 61000-4-2 to 61000-4-6 and IEC/EN 61000-4-11
Laser safety	IEC/EN 60825-1 (CFR 1040.10, CFR 1040.11)



¹ 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 attainable resolution is frequency-dependent.

² Available up to 100 kHz, else 10 m/s

³ Available up to 100 kHz, else 25 m/s

⁴ Figure in brackets: option

⁵ Corresponds to the quantization step of the internal digital interface (PSV-500-3D-H and PSV-500-3D-HV in H mode) and the internal analog interface (PSV-500-3D-M and PSV-500-3D-HV in V mode) respectively

⁶ 25 MHz available in 1D (1 scanning head) and 3D mode. The maximum bandwidth recommended for 3D is 5 MHz.

Metrological specifications PSV-500-3D-H								
Scanning Heads	Decoder	# of ranges	Full scale (peak) m/s	Decoder frequency range	Resolution ¹ ($\mu\text{m/s}$)/ $\sqrt{\text{Hz}}$	Resolution data interface ⁵ $\mu\text{m/s}$	# of reference channels	# of signal generator channels
PSV-I-500/ PSV-I-520	DV-03	14	0.001	0 Hz	0.01	0.00048	8	4
			... 12	... 100 kHz	... 0.5	... 5.7		
PSV-I-560/ PSV-I-570	DV-03	14	0.0025	0 Hz	0.01	0.0012	8	4
			... Xtra 30	... 100 kHz	... 0.15	... 14		

Metrological specifications PSV-500-3D-M								
Scanning Heads	Decoder	# of ranges	Full scale (peak) m/s	Decoder frequency range	Resolution ¹ ($\mu\text{m/s}$)/ $\sqrt{\text{Hz}}$	Resolution data interface ⁵ $\mu\text{m/s}$	# of reference channels	# of signal generator channels
PSV-I-500/ PSV-I-520	DV-04	14	0.001	0 Hz	0.01	0.0038	1	1
			... 12 ²	... 1 (2) ⁴ MHz	... 3	... 458		
PSV-I-560/ PSV-I-570	DV-04	14	0.0025	0 Hz	0.01	0.095	1	1
			... Xtra 30 ³	... 1 (2) ⁴ MHz	... 8	... 1144		

Metrological specifications PSV-500-3D-HV								
Scanning Heads/ Acquisition Mode	Decoder	# of ranges	Full scale (peak) m/s	Decoder frequency range	Resolution ¹ ($\mu\text{m/s}$)/ $\sqrt{\text{Hz}}$	Resolution data interface ⁵ $\mu\text{m/s}$	# of reference channels	# of signal generator channels
PSV-I-500/ PSV-I-520	DV-08	14	0.001	0 Hz	0.01	0.00048	8	4
			... 12	... 100 kHz	... 0.5	... 5.7		
H mode PSV-I-500/ PSV-I-520	DV-08	14	0.001	0 Hz	0.01	0.038	1	1
			... 12 ²	... 25 MHz ⁶	... 18	... 458		
V mode PSV-I-560/ PSV-I-570	DV-08	14	0.0025	0 Hz	0.01	0.0012	8	4
			... Xtra 30	... 100 kHz	... 0.15	... 14		
H mode PSV-I-560/ PSV-I-570	DV-08	14	0.0025	0 Hz	0.01	0.095	1	1
			... Xtra 30 ³	... 25 MHz ⁶	... 48	... 1144		
V mode								



Options and accessories

PSV-A-526 Protective Window	Protects the scanning mechanism against dust, wind and acoustic excitation at high dB levels.
PSV-C-5xx Main Cable	Available length: 5, 10, 20 and 30 m.
Accessories for measurements on small parts	
PSV-A-T34 Table Tripod	Rigid support of 3 PSV scanning heads. Provides a configuration optimized for in-plane performance with small parts.
PSV-A-T35 Table Tripod	Rigid support of 3 PSV scanning heads. Provides a narrow configuration optimized for out-of-plane performance with small parts.
PSV-A-450 Reference Object	Facilitates high-precision 3D alignment of the sensor heads. Recommended for small measurement objects and dynamic strain and stress analyses.
PSV-A-HNeBF Helium-Neon Block Filter ¹	Notch filter for improved laser spot visibility when measuring very small parts or mirror-like surfaces.
Accessories for (brake) acoustics and modal analysis	
PSV-A-T51 Motorized Tripod	Convenient motorized support for 3 PSV scanning heads.
PSV-A-430 Acoustic Gate Unit	Activates the gate input if a noise exceeds a certain threshold.
PSV-A-MIR-S001/A-MIR-S002 Mirror Set	Mirror set for measurements in difficult-to-access areas. The mirror set comprises 4 (PSV-A-MIR-S002: 5) front coated mirrors including magnetic fixtures.

¹ Not suitable for PSV-I-560/-570 Scanning Head Xtra



PSV-I-560 / PSV-I-570 Scanning Head Xtra as upgrade for highest optical sensitivity



PSV-A-T34 Table Tripod



PSV-A-526 Protective Window protects the scanning unit

Software options

Model	PSV-500-3D Scanning Vibrometer	-H	-M	-HV
Preparation				
APS Professional	For arbitrary definition of measurement points and individual object properties.	S	S	S
GeoWorks Working with Geometries	Facilitates importing of geometry data for scan point definition and visualization.	S	S	S
GeoPro Extended Geometry Processing	Like GeoWorks Working with Geometries, but featuring additional import filters and an extended toolkit for scan point manipulation.	O	O	O
VideoTriangulation®	Image processing for enhanced automatic alignment and superposition of the 3 laser spots. Returns the object distance for a true geometry measurement.	S	S	S
Signal Generator	Internal arbitrary signal generator for vibration excitation.	S	S	S
Measurement				
High Resolution Scan	Up to 512 x 512 scan point density for higher spatial resolution.	S	S	S
FastScan	Fast scan routine for analyzing the response of structures at a single frequency.	S	S	S
Time Domain Animation	Time domain data are acquired while scanning. Allows for “slow motion” animation e.g. of surface waves propagation or switches.	O	O	O
Extended FFT Lines	Various options to extend the number of FFT lines up to 819,200.	O	O	O
Multi Frame	For triggered measurements on combustion engines and brakes.	O	–	O ¹
Bandwidth Extension	Extends the acquisition bandwidth to 2 MHz.	–	O	–
Gate Input	Allows gated measurements with external TTL signal.	S	S	S
Analysis & interfaces				
SignalProcessor	The user interface to the math library included in the PSV software, designed as an easy-to-use spreadsheet.	S	S	S
UFF Interface	Universal File Format data conversion from and to major modal analysis and Finite Element packages.	S	S	S
PCA	Principal Component Analysis. For MIMO measurements in experimental modal analysis.	O	–	O ¹
PolyWave Software Suite	Scalable post-processing software suite for comprehensive analysis of vibration test data. Comprises modules for experimental modal analysis, operational modal analysis and order analysis.	O	O	O
Data Export to MEscope	Data export to Vibrant’s MEscope modal analysis software.	O	O	O
ASAM ODS	Import and export of data in ASAM ODS 5.3.0 ATFX standard.	O	O	O
StrainProcessor	Post processing of measurement data for calculation of dynamic strain and stress. Stand-alone software component. Visualization of the results in PSV software.	O	O	O
Desktop Analysis Version	Desktop version of PSV software for offline post processing and presentation of measurement results.	O	O	O
Automation and programming interface				
Macro Programming	WinWrap® Basic Engine: Visual Basic® for Applications (VBA) compatible. Allows automation of test routines.	S	S	S
Polytec File Access	API for retrieval of Polytec data via external applications supporting Microsoft’s Component Object Model (COM), e.g. Visual Basic .NET®, C#, MATLAB®, LabVIEW™.	S	S	S

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LabVIEW™ is a trademark of National Instruments Corporation.

VideoTriangulation® is a registered trademark of Polytec GmbH.

WinWrap® is a trademark of Polar Engineering, Inc.

S: Standard;
O: Option;
–: Not available

¹ H mode only

Software options

Maintenance package						
Software Maintenance Basic	Basic software maintenance. Free PSV software updates for a period of 1 year.	S	S	S		
Extended Software Maintenance	Entitles for software updates for an additional period. Available in 12 month increments.	O	O	O		
University Program	Lifetime update license for universities and education (terms and conditions apply).	O	O	O		
Software macros						
RotoVib Macro	PSV software macro facilitating 3D vibration measurements on multiple sides of a sample with the aid of a turntable ² .	O	O	O		
Application specific macros	Polytec offers a range of software macros dedicated to specific measurement tasks, e.g. for measurement on break disks. Polytec gladly supports you in the development of new macros tailored to your needs.	O	O	O		

S: Standard;
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–: Not available

² Optional for all 3 models



Analysis of both in-plane and out-of-plane motions for understanding complex dynamics, here on an automotive brake.

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