

PSV-500 Scanning Vibrometer

Polytec 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 B, 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 3D system
- Optional Xtra technology for improved SNR unveiling more details

PSV-500 Scanning Vibrometer

Full-field vibration measurement

Datasheet



Technical data



PSV-500 Standard scope of supply

	PSV-500-B PSV-500-H	PSV-500-M	PSV-500-HV
Vibrometer system & data acquisition	<ul style="list-style-type: none"> PSV-I-500 Scanning Head with high precision scanner and HD video camera PSV-F-500 Front-End with digital broadband decoder 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, 24" (61 cm) TFT monitor, 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"> VIB-A-T02 Tripod with tip-tilt head PSV-A-CL-VID Set of Close-Up Lenses for Video Camera Manuals PSV-A-535 Storage Case for scanning head 	<ul style="list-style-type: none"> PSV-A-013 System Cabinet 	<ul style="list-style-type: none"> PSV-A-013 System Cabinet

PSV-500 Scanning Heads

	PSV-I-500 Scanning Head	PSV-I-550 Scanning Head Xtra
Dimensions [W x L x H]	189 x 370 x 177 mm (74.4 x 145.7 x 69.7 in)	
Weight	9 kg (19.8 lbs); 9.2 kg with PSV-G-500 Geometry Scan Unit ¹	9.3 kg (20.5 lbs); 9.5 kg with PSV-G-500 Geometry Scan Unit ¹
Laser type, vibrometer	<ul style="list-style-type: none"> Measuring laser: HeNe, wavelength 633 nm (red), Laser power <1 mW 	<ul style="list-style-type: none"> Measuring laser: wavelength 1,550 nm (invisible), Laser power <10 mW Pilot laser²: wavelength 520 nm (green), Laser power <1 mW
Laser type, PSV-G-500 Geometry Scan Unit ¹	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 ¹ : 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 Option

² 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, RJ45 Ethernet to computer
Interfaces, mechanical	19" Rack mount adapters

PSV-E-530 Junction Box (PSV-500-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 connectors for 3 reference channels, signal generator, trigger Rear: connector for vibrometer channel and to data acquisition to PC
Interfaces, mechanical	19" Rack mount adapters

General specifications

Power	100 VAC...240 VAC \pm 10%, 50/60 Hz; 500 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)

**Metrological specifications PSV-500-B enhanced**

Scanning Head	Decoder	# of ranges	Full scale (peak) m/s	Decoder frequency range	Resolution ¹ ($\mu\text{m/s}$)/ $\sqrt{\text{Hz}}$	Resolution data interface ² $\mu\text{m/s}$	# of reference channels	# of signal generator channels
PSV-I-500 Scanning Head	DV-02	10	0.01 ... 10	0 Hz ... 50 kHz	0.02 ... 0.5	0.0048 ... 4.8	1 (4) ³	1 (4) ³
PSV-I-550 Scanning Head Xtra	DV-02	10	0.025 ... 25	0 Hz ... 50 kHz	0.01 ... 0.15	0.012 ... 12	1 (4) ³	1 (4) ³

Metrological specifications PSV-500-B high resolution

Scanning Head	Decoder	# of ranges	Full scale (peak) m/s	Decoder frequency range	Resolution ¹ ($\mu\text{m/s}$)/ $\sqrt{\text{Hz}}$	Resolution data interface ² $\mu\text{m/s}$	# of reference channels	# of signal generator channels
PSV-I-500 Scanning Head	DV-03	14	0.001 ... 12	0 Hz ... 50 (100) ³ kHz	0.01 ... 0.5	0.00048 ... 5.7	1 (4) ³	1 (4) ³
PSV-I-550 Scanning Head Xtra	DV-03	14	0.0025 ... 30	0 Hz ... 50 (100) ³ kHz	0.01 ... 0.15	0.0012 ... 14	1 (4) ³	1 (4) ³

Metrological specifications PSV-500-H

Scanning Head	Decoder	# of ranges	Full scale (peak) m/s	Decoder frequency range	Resolution ¹ ($\mu\text{m/s}$)/ $\sqrt{\text{Hz}}$	Resolution data interface ² $\mu\text{m/s}$	# of reference channels	# of signal generator channels
PSV-I-500 Scanning Head	DV-03	14	0.001 ... 12	0 Hz ... 100 kHz	0.01 ... 0.5	0.00048 ... 5.7	8	4
PSV-I-550 Scanning Head Xtra	DV-03	14	0.0025 ... 30	0 Hz ... 100 kHz	0.01 ... 0.15	0,0012 ... 14	8	4

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

³ Figure in brackets: option

**Metrological specifications PSV-500-M**

Scanning Head	Decoder	# of ranges	Full scale (peak) m/s	Decoder frequency range	Resolution ¹ ($\mu\text{m/s}$)/ $\sqrt{\text{Hz}}$	Resolution data interface ² $\mu\text{m/s}$	# of reference channels	# of signal generator channels
PSV-I-500 Scanning Head	DV-04	14	0.001 ... 12 ⁴	0 Hz ... 1(2) ³ MHz	0.01 ... 3	0.038 ... 458	3	1
PSV-I-550 Scanning Head Xtra	DV-04	14	0.0025 ... 30 ⁵	0 Hz ... 1(2) ³ MHz	0.01 ... 8	0.095 ... 1144	3	1

Metrological specifications PSV-500-HV

Scanning Head/ 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 ² $\mu\text{m/s}$	# of reference channels	# of signal generator channels
PSV-I-500 Scanning Head/ V mode	DV-08	14	0.001 ... 12 ⁴	0 Hz ... 25 MHz	0.01 ... 18	0.038 ... 458	3	1
PSV-I-500 Scanning Head/ H mode	DV-08	14	0.001 ... 12	0 Hz ... 100 kHz	0.01 ... 0.5	0.00048 ... 5.7	8	4
PSV-I-550 Scanning Head Xtra/ V mode	DV-08	14	0.0025 ... 30 ⁵	0 Hz ... 25 MHz	0.01 ... 48	0.095 ... 1144	3	1
PSV-I-550 Scanning Head Xtra/ H mode	DV-08	14	0.0025 ... 30	0 Hz ... 100 kHz	0.01 ... 0.15	0.0012 ... 14	8	4

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

³ Figure in brackets: option

⁴ Available up to 100 kHz, else 10 m/s

⁵ Available up to 100 kHz, else 25 m/s



Options and accessories

PSV-G-500 Geometry Scan Unit	Integrated laser distance sensor to measure the sample geometry.
PSV-A-560 Coherence Optimizer ¹	Laser stabilization improves overall signal-to-noise ratio.
PSV-A-526 Front Window	Protects the scanning mechanism against dust, wind and acoustic excitation at high dB levels.
External scanner control	Allows for an additional control of the scanning mirrors by external voltage signals.
PSV-A-013 System Cabinet	Ergonomic mobile workstation with storage for all parts and accessories.
PSV-C-5xx Main Cable	Available length: 5, 10, 20 and 30 m.

For measurements on small parts

PSV-A-410 Close-up Unit	For close-up measurements, particularly on small parts. Special PSV-A-CL-xx micro scan lenses for small shiny parts available.
PSV-A-HNeBF Helium-Neon Block Filter ¹	Notch filter for improved laser spot visibility when measuring very small parts or mirror-like surfaces.
PSV-A-RLight Ring Light	Fiber optic ring light for illumination of small test objects. Requires PSV-A-410 Close-up Unit.
PSV-A-T18 Vertical Test Stand	Motorized positioning of PSV scanning head for small part testing.

Accessories for (brake) acoustics and modal analysis

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.
VIB-A-HEAD Headphones	Headphone with noise limiter to listen to the vibrometer signal.

Accessories for measuring on rotating parts

PSV-A-440 Optical Derotator ¹	For axial measurement of rotating objects. Locks onto the rotation and allows measurements as if stationary up to 24,000 rpm.
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¹ Not suitable for PSV-I-550 Scanning Head Xtra



PSV-I-550 Scanning Head Xtra as upgrade for highest optical sensitivity



PSV-A-410 Close-up Unit for measuring on very small samples



PSV-A-526 Front Window protects the scanning unit

Software options

Model	PSV-500 Scanning Vibrometer	-B	-H	-M	-HV
Preparation					
APS Professional	For arbitrary definition of measurement points and individual object properties	S	S	S	S
Geometry Data Import	Geometry module for importing geometry data to the PSV software for defining the scan points	O	O	O	O
VideoTriangulation®	Image processing for enhanced automatic alignment of the laser spot with the grid points	O	O	O	O
Signal Generator	Internal arbitrary signal generator for vibration excitation	S	S	S	S
Measurement					
High Resolution Scan	Up to 512 x 512 scan point density for higher spatial resolution	O	S	S	S
FastScan	Fast scan routine for analyzing the response of structures at a single frequency	O	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	O
Extended FFT Lines	Various options to extend the number of FFT lines up to 819,200	O	O	O	O
Multi Frame	For triggered measurements on combustion engines and brakes	O	O	–	O ¹
Bandwidth Extension	Extends the acquisition bandwidth to 2 MHz	–	–	O	–
Gate Input	Allows gated measurements with external TTL signal	O	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	O	S	S	S
UFF Interface	Universal File Format data conversion from and to major modal analysis and Finite Element packages	S	S	S	S
PCA	Principal Component Analysis. For MIMO measurements in experimental modal analysis.	O	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	O
Data Export to ME’scope	Data export to Vibrant’s ME’scope modal analysis software	O	O	O	O
ASAM ODS	Import and export of data in ASAM ODS 5.3.0 ATEX standard	O	O	O	O
Audio Analysis	Makes vibration data audible. Allows listening to live and stored vibration signals.	O	O	O	O
Desktop Analysis Version	Desktop version of PSV software for offline post processing and presentation of measurement results	O	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	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	S

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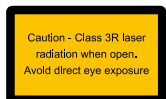
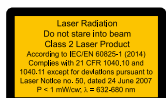
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S: Standard;
O: Option;
–: Not available

¹ H mode only



Software options

Maintenance package					
Software Maintenance Basic	Basic software maintenance. Free PSV software updates for a period of 1 year (-H, -M, -HV: 2 years)	S	S	S	S
Extended Software Maintenance	Entitles for software updates for an additional period. Available in 12 month increments.	○	○	○	○
University Program	Lifetime update license for universities and education (terms and conditions apply)	○	○	○	○
Software Macros					
Application specific macros	Polytec gladly supports you in the development of new macros tailored to your needs.	○	○	○	○



Optimizing acoustics with full-field vibration mapping.

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