Polytec

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	■ 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		■ PSV-E-530 Junction Box ■ data acquisition and signal generator board installed in front-end (for H mode)
Computer	■ PSV-W-500 Data Management System: 19” industrial PC, wireless keyboard and mouse ■ Windows® 7 64-bit for “embedded systems” and PSV software preinstalled		
		■ data acquisition and signal generator board installed in PC	■ data acquisition and signal generator board installed in PC (for V mode)
Accessories	■ 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 ■ reference object for head alignment ■ laser adjustment goggles ■ hardware manual, software manual and theory manual		

PSV-500 Scanning Heads		
	PSV-I-500/PSV-I-520 Scanning Head	**PSV-I-560/PSV-I-570 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	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	▪ Measuring laser: HeNe, wavelength 633 nm (red), Laser power <1 mW	▪ Measuring laser: wavelength 1,550 nm (invisible), Laser power <10 mW ▪ Pilot laser: 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 <0.002°, Angular stability <0.001°/h, max. 30 scan points/s	
Sample size	From a few mm² up to several m²	
Camera	HD format, 20x optical zoom, max. field of view [h x v] 55° x 32°	
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	

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-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: conncetor for vibrometer channel and to data acquistion 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 ±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 61010-1:2011-07
	IEC/EN 61326-1:2013-07; 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 60825-1:2008-05 (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] (µm/s)/√Hz	Resolution data interface [5] µm/s	# of reference channels	# of signal genarator channels
PSV-I-500/ PSV-I-520 Scanning Head	DV-03	14	0.001 ... 12	0 Hz ... 100 kHz	0.005 ... 0.05	0.00048 ... 5.7	8	4
PSV-I-560/ PSV-I-570 Scanning Head Xtra	DV-03	14	0.0025 ... 30	0 Hz ... 100 kHz	0.03 ... 0.14	0.0012 ... 14	8	4

Metrological Specifications PSV-500-3D-M

Scanning Heads	Decoder	# of ranges	Full scale (peak) m/s	Decoder frequency range	Resolution [1] (µm/s)/√Hz	Resolution data interface [5] µm/s	# of reference channels	# of signal genarator channels
PSV-I-500/ PSV-I-520 Scanning Head	DV-04	14	0.001 ... 12 [2]	0 Hz ... 1 (2) [4] MHz	0.01 ... 3	0.0038 ... 458	1	1
PSV-I-560/ PSV-I-570 Scanning Head Xtra	DV-04	14	0.0025 ... 30 [3]	0 Hz ... 1 (2) [4] MHz	0.04 ... 8	0.095 ... 1144	1	1

Metrological Specifications PSV-500-3D-HV

Scanning Heads/ Acquisition Mode	Decoder	# of ranges	Full scale (peak) m/s	Decoder frequency range	Resolution [1] (µm/s)/√Hz	Resolution data interface [5] µm/s	# of reference channels	# of signal genarator channels
PSV-I-500/ PSV-I-520 Scanning Head/ V mode	DV-08	14	0.001 ... 12 [2]	0 Hz ... 25 MHz [6]	0.01 ... 18	0.038 ... 458	1	1
PSV-I-500/ PSV-I-520 Scanning Head/ H mode	DV-08	14	0.001 ... 12	0 Hz ... 100 kHz	0.005 ... 0.05	0.00048 ... 5.7	8	4
PSV-I-560/ PSV-I-570 Scanning Head Xtra/ V mode	DV-08	14	0.0025 ... 30 [3]	0 Hz ... 25 MHz [6]	0.04 ... 48	0.095 ... 1144	1	1
PSV-I-560/ PSV-I-570 Scanning Head Xtra/ H mode	DV-08	14	0.0025 ... 30	0 Hz ... 100 kHz	0.03 ... 0.14	0.0012 ... 14	8	4

Options and Accessories	
PSV-A-526 Front Window	Protects the scanning mechanism against dust, wind and acoustic excitation at high dB levels.
PSV-A-550 Remote Control	Remote control of the PSV software via tablet computer and PSV Commander app. Enables optimum laser positioning during measurement setup, as user can stand right at the measurement object.
PSV-C-5xx Main Cable	Available length: 5, 10, 20 and 30 m.
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-515-Z External Video Camera	High resolution external video camera with wide angle lens (to extend the field of view) and zoom lens (for small measurement samples). Interfaces with PSV-A-T34 Table Tripod.
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-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 / PSV-A-MIR+ Mirror Set	Mirror set for measurements in difficult-to-access areas. The mirror set comprises 4 (PSV-A-MIR+: 5) front coated mirrors including magnetic fixtures.
A-MIR-2030 Mirror Set	Mirror set with one mirror 200 x 300 mm and magnetic fixtures

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

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

PSV-A-T34 Table Tripod

PSV-A-550 Remote Control via tablet PC

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
Geometry Data Import	Geometry module for importing geometry data to the PSV software for defining the scan points	S	S	S
VideoTriangulation®	Image processing for enhanced automatic alignment of the laser spot with the grid points	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]
ME’scope Modal Software	Software package for modal analysis. Including data interface.	O	O	O
Data Export to ME’scope	Data export to Vibrant’s ME’scope 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
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

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

[1] H mode only

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

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