

RSV-150 Remote Sensing Vibrometer

The detection of vibration, resonance frequencies and displacement on distant buildings, machine parts and other structures can be achieved quickly and effortlessly with the RSV-150 Remote Sensing Vibrometer. Designed for point-and-shoot measurement from a distance, its advanced laser Doppler interferometer technology eliminates time consuming contact sensor installation. Hence, the RSV-150 Remote Sensing Vibrometer is the ideal tool for cost-effective monitoring of the structural health or dynamic behavior of bridges, buildings and industrial plants.

For lab applications, a short range variant of the RSV-150 is also available. Its ability to measure on literally any surface without prior treatment puts the RSV-150 in a league of its own as one of the most sensitive optical vibration measurement systems worldwide.



Highlights

- Works on nearly all surfaces - even corroded and dirty
- Remote access to distant hazardous areas
- True zero Hz performance - precisely determine natural frequencies for health monitoring and model validation
- Small laser spot size for highest spatial resolution
- Easy setup in minutes - no sample cabling or surface preparation
- Patented integrated optical channel for precise targeting

RSV-150 Remote Sensing Vibrometer

Remote detection of vibrations from large and distant structures

Datasheet



Technical data



Sensor head	RSV-I-150
Optics	Manual focusing, min. stand-off distance ¹ 5 m, max. stand-off distance ² >300 m
Spatial resolution	Laser spot 7.5 mm @ 100 m, depth of field 28.7 m @ 100 m
Laser	<ul style="list-style-type: none"> ■ Targeting laser: wavelength 532 nm (green), effective output power <1 mW ■ Measurement laser: wavelength 1550 nm, output power 10 mW Class 2 with both lasers in operation
Signal level	LED bar indicator; indicates return signal strength
Laser emission	Emission indicator LED on backplate
Camera	PAL CCD color camera, 765 x 582 pixels (optional)
Dimensions L x W x H	407 mm x 165 mm x 145 mm incl. front lens
Weight	-8 kg (9.8 kg incl. RSV-A-P05 Pan/Tilt fine adjustment)
Protection class	IP63 (dust and spray protection)
Mechanical interfaces	<ul style="list-style-type: none"> ■ 1/4" – 20 UNC thread for tripod, 2 x M6 threaded holes at baseplate (3/8" – 16 UNC thread for tripod, if fine adjustment adapter is mounted) ■ 10-32 UNF-2B standard thread for accelerometer (back)

Controller	RSV-E-150-B	RSV-E-150-M
Decoding	Digital	Digital
Velocity output	8 sensitivity ranges: 0.4 mm/s/V – 100 mm/s/V, Full scale (peak) 1 m/s; Analog output ±10 V, BNC connector Typical resolution ⁴ : 10 nm s ⁻¹ /√Hz @ 2.5 kHz	8 sensitivity ranges: 12.25 mm/s/V – 2450 mm/s/V, Full scale (peak) 24.5 m/s; Analog output ±10 V, BNC connector Typical resolution ⁴ : 150 nm s ⁻¹ /√Hz @ 50 kHz
Displacement output	16 sensitivity ranges: 1 μm/V – 100 mm/V, full scale (peak-to-peak) 2 m, analog output ±10 V, BNC connector Resolution ⁵ : 0.3 nm	16 sensitivity ranges: 0.1225 μm/V ³ – 12.25 mm/V, full scale (peak-to-peak) 245 mm ³ , analog output ±10 V, BNC connector Resolution ⁵ : 0.04 nm
Acceleration output	on request	-
Frequency bandwidth	0 Hz ... 25 kHz (range dependent)	0 Hz ... 2 MHz ⁶ (range dependent)
High pass filters	100 Hz, 10 Hz (suppression of ground vibration)	
Low pass filters	1 kHz, 5 kHz	1 kHz, 10 kHz, 100 kHz
Tracking Filter	–	3 settings: slow, fast, off
Video output	CVBS signal, 1 V _{p-p} /75 Ω, BNC, PAL standard	
Direct voltage output	12V DC power supply for the optional monitor A-MON-TFT3	
Settings	LCD display and soft keys, software remote control via USB (with included software Vibrometer Panel)	
Signal level	LED bar indicator and RSSI voltage output (BNC)	
Dimensions L x W x H	235 mm x 320 mm x 150 mm (1/2 19", 42 HP/3 U)	
Weight	6 kg	
Power supply	Desktop power supply: 100 VAC...240 VAC ±10%, 50/60Hz DC voltage connection: 12 VDC...24 VDC ±10%	
Power consumption	Max. 75 W, max. 60 W for DC power supply	
Protection class	IP20	
PC interfaces	USB 1.1, system remote control	

¹ Shorter stand-off distances between 0.75 m and 5 m are possible, when using the additional RSV-A-xxx Close-Up lenses (see accessories).

² Depending on target reflectivity and amplitude.

³ Larger displacement sensitivity ranges on request.

⁴ 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 Scotchlipe™ Tape (retro-reflective film) in a distance of 5 m. The attainable resolution is frequency dependent. The typical value refers to the center of the operating frequency range.

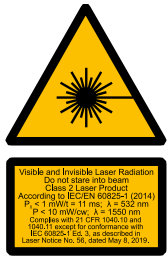
⁵ Resolution of the smallest measurement range. The resolution corresponds to the quantization step of approx. 0.3 mV at the analog output.

⁶ If higher frequencies are needed, a Controller with 24 MHz maximum Frequency bandwidth is available on request.

General specifications	
Targeting	<ul style="list-style-type: none"> ■ Visual targeting with green laser spot and additional reticle overlay in telescopic camera image ■ Coarse adjustment with geared tripod head (pan/tilt) ■ Fine adjustment with adapter plate ($\pm 1^\circ$ tilt, $\pm 1.5^\circ$ pan), repeatability approx. 5 mm @ 100 m
Operating temperature	+5 °C ... +40 °C (41 °F ... 104 °F)
Total weight	Approx. 30 kg (including storage case, excluding tripod)



Compliance with standards	
Laser safety	IEC/EN 60825-1
Electrical safety	IEC/EN 61010-1
EMC	IEC/EN 61326-1 Emission: Limit 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
RoHS EN 50581	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances



Options and accessories	
RSV-A-CAM Integrated optical channel	Patented in-line video targeting optics with integrated camera (optional)
VIB-A-T07 Tripod with Geared Head	Rigid tripod with 3-way geared head Adjustment: Tilt +90° to -30°. Pan 360°
RSV-A-P05 Pan/Tilt Fine Adjustment	Fine Adjustment adapter for sensor head for easy and precise targeting over long distances
A-VIS-SCOP1 Scope	Scope with variable magnification allows a wider field of view and easier selection of target on uniform structures like stay-cables
A-MON-TFT3 Monitor	5" monitor with tripod mount for comfortable and easy targeting
A-VIB-ACC1 Seismic Reference Sensor	Reference Accelerometer; can be used to measure and compensate for ambient vibration
A-CON-VIDEO USB Video Converter adapter	Video-to-USB converter for displaying the image of the integrated video camera of the RSV-150 on a computer via USB

VibSoft-20 data acquisition system	
Features	Easy-to-use USB data acquisition 204,800 FFT lines; time domain analysis up to 64 MSamples Integrated live video; SignalProcessor for post processing; export filters; macro programming interface; remote control of controller sensitivity and filters
Input	VIB-E-220 Frontend, USB 2.0; 2 channels, IEPE sensor power supply, AC and DC coupling
Frequency bandwidth	20 kHz per channel
System requirements	Processor with SSE2 instruction set like AMD® Athlon™ 64 3500, Intel® Pentium™ 4, Intel® Celeron™ D, 1 GByte RAM with operating system Windows 10 64-Bit or Windows 7 64-Bit (SP1).

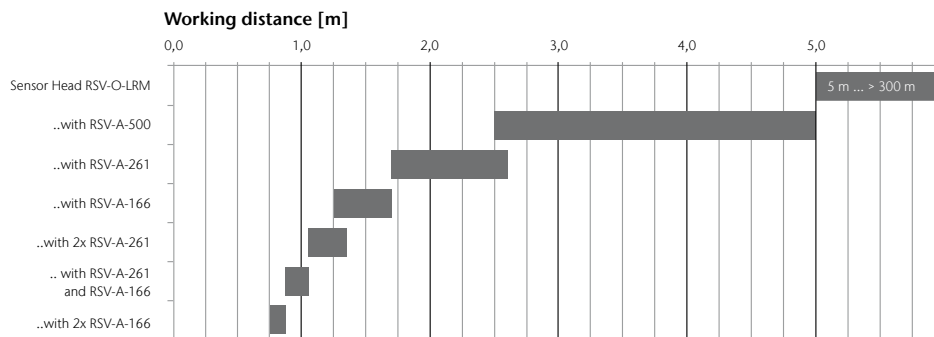


Close-up lens or combination of close-up lenses	Working distance ¹ [m]	Available sets of close-up lenses RSV-A-			
		CLS01	CLS02	CLS03	CLS04
RSV-A-500	5.0...2.5				x
RSV-A-261	2.5...1.7	x		x	x
RSV-A-166	1.7...1.25	x	x		x
RSV-A-261 + RSV-A-261	1.35...1.05			x	
RSV-A-261 + RSV-A-166	1.05...0.87	x			x
RSV-A-166 + RSV-A-166	0.87...0.75		x		

The RSV-150 Remote Sensing Vibrometer high-aperture optics are designed for best optical sensitivity at long range. A choice of close-up lenses is available to accommodate to distances between 0.75 m and 5 m for typical lab working distances. Thus experiments with uncooperative surfaces like biological probes benefit from the superior optical sensitivity.

Stand-off distance ¹ [m]	Laser spot diameter [μm]	Laser depth-of-field [m]	Camera field of view [mm]
0.75	50	±0.0013	17.1 x 12.7
0.87	60	±0.0018	20.1 x 15
1.05	75	±0.0026	24.7 x 18.5
1.25	90	±0.0038	29.5 x 22
1.7	120	±0.0071	40.3 x 30.1
2.5	172	±0.0150	58 x 43
5.0	365	±0.0620	110 x 83
10.0	710	±0.2600	220 x 170
100	752	±28.7	2270 x 1700
150	1210	±74	3410 x 2550

¹ Measured from the front edge of the lens mount



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