

## RLV-5500 Rotational Laser Vibrometer

Rotational vibrometers measure angular velocity and displacement as well as rotational vibrations on arbitrarily shaped structures. They allow swift and precise analysis of rotational dynamics of automotive drivetrains, gas turbines, electrical generators, printers and photocopiers for effective product development and troubleshooting.

The RLV-5500 Rotational Laser Vibrometer incorporates high-performance digital decoding techniques for a perfect signal-to-noise-ratio, an outstanding RPM range and a compact measurement head. The compact size of the sensor head makes it easier to get close to the measurement object. For industrial environments, a robust design is combined with an integrated air purge system to cool the sensor head and prevent contamination from oil mist and dust.



### Highlights

- Quick setup, alignment and non-contact measurement
- Easily repositioned to different parts of rotating machinery
- High resolution within expanded RPM range
- Insensitive to ambient vibration
- No added inertial mass during measurement
- High signal-to-noise-ratio through digital demodulation and filtering
- Integrated air purge to cool and protect the optics

## RLV-5500 Rotational Laser Vibrometer

## Non-Contact Measurement of Rotational Vibration Datasheet



# Technical Data



## Optics Specifications

### RLV-500 Sensor Head

Stand-off distance	70 mm	200 mm	400 mm	600 mm
Beam separation 7.5 mm	RLV-500-175	RLV-500-275	RLV-500-475	RLV-500-675
Beam separation 24 mm	RLV-500-124	RLV-500-224	RLV-500-424	RLV-500-624

## Metrological Specifications

### Rotations per Minute

RLV-500 Sensor Head	7.5 mm beam separation	24 mm beam separation
Measurement range	-8,000 RPM ... +20,000 RPM	-2,500 RPM ... +6,500 RPM
Analog output	-4 V ... +10 V	-2.5 V ... +6.5 V
Calibration error <sup>1</sup>	< 0.6% of RPM reading ±2 RPM	< 0.3% of RPM reading ±2 RPM
Filter settings	DC; slow/medium/fast	

### Angular Velocity ( $\Delta\omega$ )

RLV-500 Sensor Head	7.5 mm beam separation				24 mm beam separation			
Measurement ranges ( $^{\circ}/s/V$ )	10	100	1,000	12,000	10	100	1,000	6,000
Peak analog output ( $V_{peak}$ )	±10	±10	±10	+10/-4	±10	±10	±10	+6.5/-2.5
Frequency range (kHz)	0.001 ... 10				0 ... 10		0.001 ... 10	
Measurement error	<1% (at $f = 1$ kHz)							
Noise properties	See diagram							
Filters	High and low-pass filters, order and variable band-pass filters							

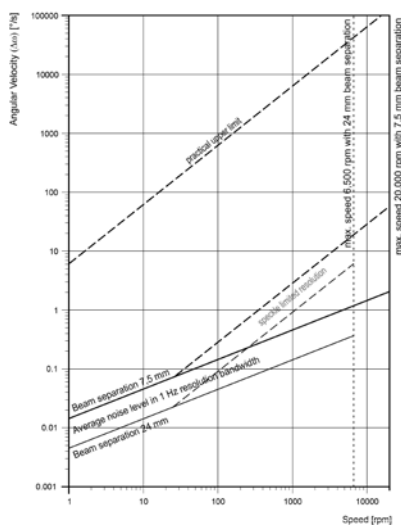
### Angular Displacement ( $\Delta\varphi$ )

Measurement ranges	0.01 $^{\circ}/V$	0.1 $^{\circ}/V$	1 $^{\circ}/V$
Peak analog output ( $V_{peak}$ )	±10 V	±10 V	±10 V
Lower frequency limit $f_u$	1 Hz ... 100 Hz <sup>2</sup>	1 Hz ... 10 Hz <sup>2</sup>	1 Hz
Measurement error	<2% ( $f = 5 \cdot f_u$ ... 8 kHz); <10% ( $f = f_u$ ... 10 kHz)		
Filters	High and low-pass filters, order and variable band-pass filters		

<sup>1</sup> Valid at nominal stand-off distance ± 50 mm

<sup>2</sup> Dependent on selected angular velocity range

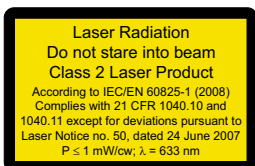
## Operating range





<b>General Specifications</b>			
System	Dual interferometer system with heterodyne detection		
Components	RLV-5000 Controller (19" rack-mountable housing)	RLV-500 Sensor Head	
		Laser Unit	Sensor
Dimensions [L x W x H]	450 x 360 x 150 mm (17.7 x 14.2 x 5.9 in)	330 x 170 x 175 mm (13 x 6.7 x 6.9 in)	115 x 56 x 35.5 mm (4.5 x 2.2 x 1.4 in)
Weight	9 kg (19.8 lbs)	8 kg (17.6 lbs)	0.5 kg (1.1 lbs)
Housing protection	IP-21	IP-67 (IP-64 with signal indicator)	IP-67
Operating temperature	+5 °C ... +40 °C (41 °F ... 104 °F)	+5 °C ... +40 °C (41 °F ... 104 °F)	+5 °C ... +50 °C (41 °F ... 122 °F)
Laser type	Helium-Neon, 633 nm (red)		
Laser output	<1 mW per beam, Class 2		
Cable length	3 m from Laser Unit to Sensor		
Storage temperature	-10 °C ... +65 °C (14 °F ... 149 °F)		
Relative humidity	<80%, non-condensing		
Mains voltage	100 ... 240 VAC ± 10%, 50/60 Hz		
Power consumption	max. 100 VA		
Tracking filter	1 per channel with "slow" and "fast" option		
Analog outputs (BNC)	<ul style="list-style-type: none"><li>▪ RPM</li><li>▪ Angular velocity</li><li>▪ Angular displacement</li></ul>		
Digital output	RPM, digital signal (binary value) via RS-232		
Signal level and balance indication	<ul style="list-style-type: none"><li>▪ Handheld signal level and balance indicator</li><li>▪ Additionally indicated in controller display</li></ul>		

<b>Compliance with Standards</b>	
Electrical safety	IEC/EN 61010-1:2011-07
EMC	IEC/EN 61326-1:2006-10; Emission: FCC Class B, 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)



### Options and Accessories

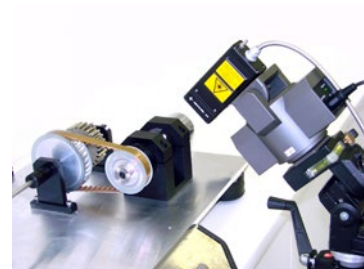
RLV-A-530	90° Deflection unit for measurements at positions difficult to reach
RLV-A-540 (included)	Air purge for improved protection against oil mist and dust
RLV-A-TRANS	Enables translational vibration measurements from 0.5 Hz to 20 kHz for velocities up to 2 m/s
A-RET-Txxx	Retroreflective adhesive tape for surface preparation; available widths 10 / 25 / 50 mm; length 4.5 m
VIB-A-T04	Heavy-duty tripod with tip/tilt head
VIB-A-T05	Heavy-duty tripod with geared tip/tilt head
A-PTT-9015	Remote controlled motorized tip-tilt stage
A-PTT-C015	15 m extension cable for A-PTT-9015
A-CBA-A003	Counterbalanced extension for tripods



RLV-A-530 Deflection Unit



RLV-A-540 Air Purge



A-PTT-9015 Motorized Stage  
on VIB-A-T04 Tripod

For more information about available options and accessories visit [www.polytec.com/rotvib](http://www.polytec.com/rotvib).

 **Polytec GmbH  
(Germany)**  
Polytec-Platz 1-7  
76337 Waldbronn  
Tel. +49 7243 604-0  
info@polytec.de

**Polytec GmbH  
(Germany)**  
**Vertriebs- und  
Beratungsbüro**  
Schwarzschildstraße 1  
12489 Berlin  
Tel. +49 30 6392-5140

 **Polytec, Inc.  
(USA)**  
North American  
Headquarters  
16400 Bake Parkway  
Suites 150 & 200  
Irvine, CA 92618  
Tel. +1 949 943-3033  
info@polytec.com

**Central Office**  
1046 Baker Road  
Dexter, MI 48130  
Tel. +1 734 253-9428

**East Coast Office**  
25 South Street, Suite A  
Hopkinton, MA 01748  
Tel. +1 508 417-1040

 **Polytec Ltd.  
(Great Britain)**  
Lambda House  
Batford Mill  
Harpenden, Herts AL5 5BZ  
Tel. +44 1582 711670  
info@polytec-ltd.co.uk

 **Polytec France S.A.S.**  
Technosud II  
Bâtiment A  
99, Rue Pierre Semard  
92320 Châtillon  
Tel. +33 1 496569-00  
info@polytec.fr

 **Polytec Japan**  
Arena Tower, 13th floor  
3-1-9, Shinyokohama  
Kohoku-ku, Yokohama-shi  
Kanagawa 222-0033  
Tel. +81 45 478-6980  
info@polytec.co.jp

 **Polytec South-East Asia  
Pte Ltd**  
Blk 4010 Ang Mo Kio Ave 10  
#06-06 TechPlace 1  
Singapore 569626  
Tel. +65 64510886  
info@polytec-sea.com

 **Polytec China Ltd.**  
Room 1026, Hanwei Plaza  
No. 7 Guanghua Road  
Chaoyang District  
100004 Beijing  
Tel. +86 10 65682591  
info-cn@polytec.com