Polytec

Portable Digital Vibrometer PDV-100

High Resolution Digital Velocity Measurement

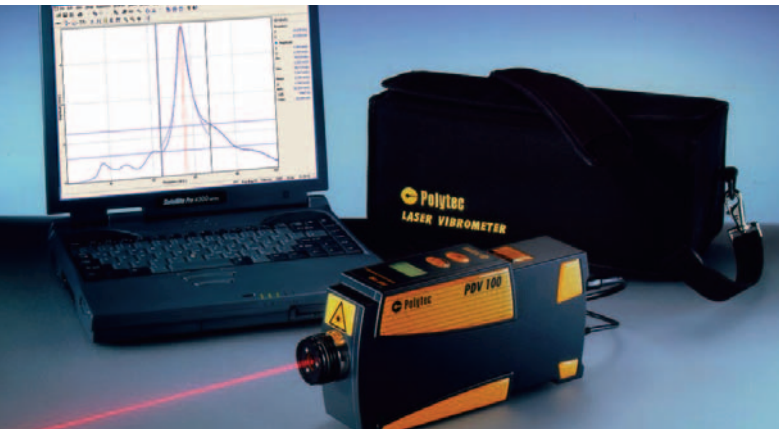
- Portable
- Robust
- Lightweight

PDV-100

Introduction

Polytec's PDV-100 Portable Digital Vibrometer measures surface vibration velocity without contact, utilizing Laser Doppler Vibrometry (LDV) technology.

The unique combination of state-of-the-art optics, digital signal processing and Polytec design experience yields excellent measurement performance, ease-of-use and long-term calibration stability in a truly portable and robust package.



PDV-100 with transportation bag and laptop based signal-processing using S/P-DIF interface

Features

- Non-contact velocity measurement in the frequency range 0 to 22 kHz
- 3 velocity ranges for highest resolution
- Digital signal processing
- Analog and digital signal outputs
- Variable working distance from 0.1 m up to 30 m
- Eye-safe visible laser
- Lightweight, ergonomic and rugged design, hermetic housing
- Low power consumption (batteries, wide voltage range AC mains adapter)

Working with the PDV-100 is Easy

Vibration measurements are made easy with the PDV-100. After focusing the laser beam on the vibrating object the measurement range is set via only two push buttons. An illuminated liquid crystal display shows the selected range, the amount of light returning to the PDV-100, and, if applicable, velocity over-range and low-battery warnings.

Selectable high and low pass frequency filters condition the velocity signal to suppress low-frequency background vibrations or unwanted high-frequency signals.

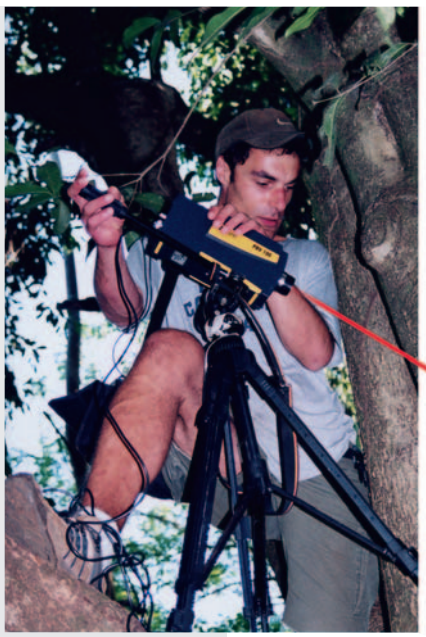
The analog velocity output interfaces to conventional analog signal processing and recording equipment. The digital velocity signal uses a transmission method proven in digital audio technology. It interfaces to digital inputs of modern recording devices or signal analyzers without any loss of accuracy.

Available accessories include the PDV-BS transportation bag with integrated lithium ion batteries for nominal five hours operation time and the VIB-A-T01 tripod.

Advantages of Digital Signal Processing

The PDV-100 digital signal processing provides superior performance:

- Excellent velocity resolution
- Outstanding measurement linearity and accuracy
- Demodulation principle independent of aging and environmental influences
- Unequalled long-term calibration stability
- Digital low pass output filters with excellent properties
- Digital signal interface to data storage or processing guarantees data accuracy and minimizes EMC interference



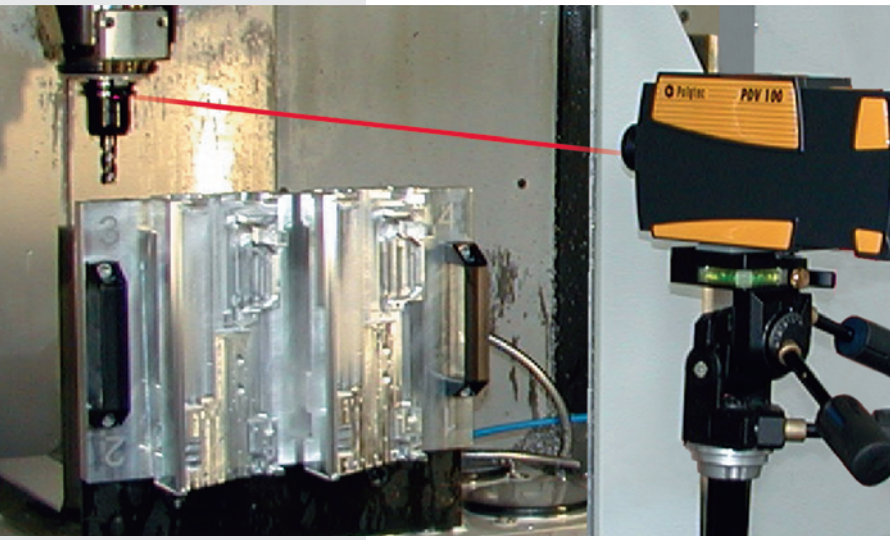
Scientific expedition using PDV-100 for vibration measurement of bees in South America jungle (Photo credit: Jarau/Hrncir, Institute of Zoology, Dept. of Neurobiology, Vienna University, Austria)

A Reliable Tool for Many Applications

If you need a portable multi purpose non-contact vibration measurement system the PDV-100 is the ideal solution. In combination with lightweight signal processing equipment and the PDV-BS transportation bag providing power, machinery vibrations, difficult to access or hazardous objects can conveniently be measured.

The PDV-100 is designed for non-contact vibration measurements where mobility and durability are important:

- Predictive maintenance of machinery
- Operating vehicles, trains or airplanes
- Buildings, bridges or other large outdoor structures
- Multi purpose field testing
- Scientific expeditions



Predictive maintenance vibration measurements of machinery

PDV-100 Standard and Optional Accessories

Included with PDV-100 are AC/DC power adapter (100–240 V AC, 50/60 Hz) with connecting cable, transportation bag, digital interface (S/P-DIF) cable (Triax / RCA), 1 sheet of reflective tape.

Optional

- PDV-BS battery supply kit with transportation bag. Integrated lithium ion battery set (rechargeable), battery charger (100–240 V AC, 50/60 Hz) with mains cable and switching box. Weight and dimensions (including PDV-100): 4.4 kg, 370 mm x 160 mm x 150 mm
- PDV-DC cable for operating PDV-100 from a 12 V vehicle power outlet or cigarette lighter socket
- VIB-A-T01 tripod with fluid head

PDV-100 with transportation bag PDV-BS

PDV-100 Technical Data

General Specifications			
Decoder type	DSP velocity decoder, 3 measurement ranges		
Frequency range	0 … 22 kHz (digital output); 0.5 Hz … 22 kHz (analog output)		
Measurement ranges	3		
Full scale peak [1] (mm s^{-1})	20	100	500
Scaling factor (mm s^{-1}/V)	5	25	125
Velocity resolution [2] (µm $s^{-1}/\sqrt{Hz}$)	< 0.02	< 0.02	< 0.1
Maximum acceleration (m s^{-2})	2,760	13,800	69,000
Working distance [3]	0.1 m ... ca. 30 m		
Laser safety	Eye-safe class II visible HeNe laser		

[1] Adjustable via the display.

[2] The resolution is defined as the signal amplitude (rms) at which the signal-to-noise ratio is 0 dB in a 1 Hz spectral bandwidth (RBW), measured on 3M Scotchlite® tape.

[3] The maximum stand-off distance depends on the surface properties of the object.

Output Signals	
Analog velocity output	
Output voltage swing	± 4 V (24 bit DAC)
Frequency range	0.5 Hz … 22 kHz
Dynamic range[1]	> 90 dB
Calibration accuracy	± 1 % (20 Hz … 22 kHz)
Digital velocity output	
Electrical S/P-DIF interface[2]	24 bit, 48 kSa/s
Frequency range	0 … 22 kHz
Calibration accuracy	± 0.2 % (0.05 Hz … 22 kHz)
Output filter	
Digital low pass filter (FIR type)	1, 5, 22 kHz (-0.1dB), roll-off >120 dB/dec
Analog high pass filter	100 Hz (-3dB), roll-off -60 dB/dec

[1] Defined as spurious free dynamic range (SFDR).

[2] S/P-DIF: Sony/Philips Digital Audio InterFace.

Housing and Power	
Dimensions L x W x H	300 mm x 63 mm x 129 mm (11.8 in x 2.5 in x 5.1 in)
Weight	~ 2.6 kg (~ 5.7 lbs)
Protection rating	IP 64 (dust and spray water protected)
Power	12 V DC, max. 15 W
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
Display	LCD, 3-line, with background lighting
Battery Kit PDV-BS	Rechargeable Li-Ion battery for min. 4 hours operation time

Compliance with Standards	
Electrical safety	IEC/EN61010
EMC	IEC/EN61326
Laser safety	IEC/EN60825-1

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