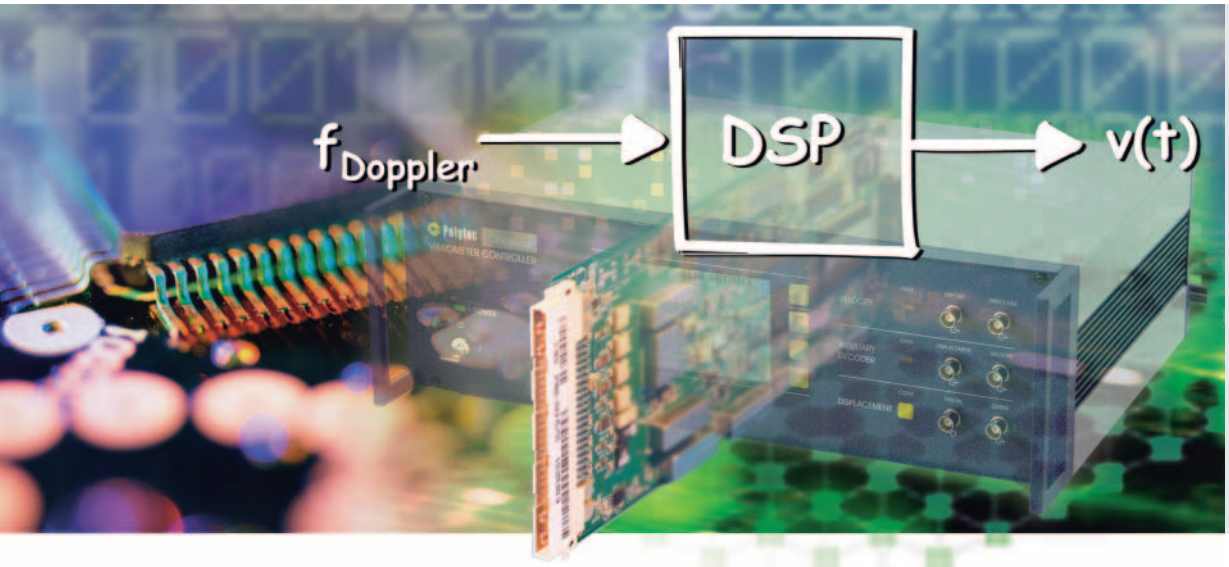
VD-09 2.5 MHz Digital Velocity Decoder



Modular Vibrometer System

- OFV-5000 Vibrometer Controller
  - **Velocity Decoders**
  - Displacement Decoders
- OFV-505/503 Standard Sensor Heads
- OFV-551/552 Fiber Interferometers
- OFV-534 Compact Sensor Head

The full range digital solution

Signal processing is a critical part of any Laser Doppler Vibrometer system. Using the latest digital signal processing technologies the first time wide bandwidth, highest resolution and high velocities are combined in a single velocity decoder. The Digital Velocity Decoder VD-09 decreases the noise level significantly by an order of magnitude, compared to analog decoders. With VD-09 installed, the OFV-5000 Velocity Controller becomes a general purpose tool for a wide range of scientific and research vibration analysis issues.

Velocity Decoding in Laser Vibrometer Systems

Polytec Laser Doppler Vibrometers operate on the Doppler principle, measuring the frequency or phase shift of back-scattered laser light from a vibrating structure, to determine its vibrational velocity and displacement.

A vibrometer system is comprised of two basic elements: a controller and a sensor head. The controller provides control voltages and power to the sensor head and processes the raw sensor head output signal to extract the measurement. This processing is performed by specially developed decoders within the controller to obtain velocity and displacement information about the vibration of the structure.

Polytec offers a range of analog and digital velocity decoders with different characteristics. The VD-09 velocity decoder has been developed as wide bandwidth general purpose device enabling challenging measurements with all OFV sensor heads.

VD-09 Key Features

- Digital decoding
- 0 – 2.5 MHz bandwidth
- 8 broadband measurement ranges + 6 low-pass filtered ranges
- 10 m/s maximum velocity
- Maximum acceleration 9,600,000 g

The VD-09 2.5 MHz Digital Velocity Decoder

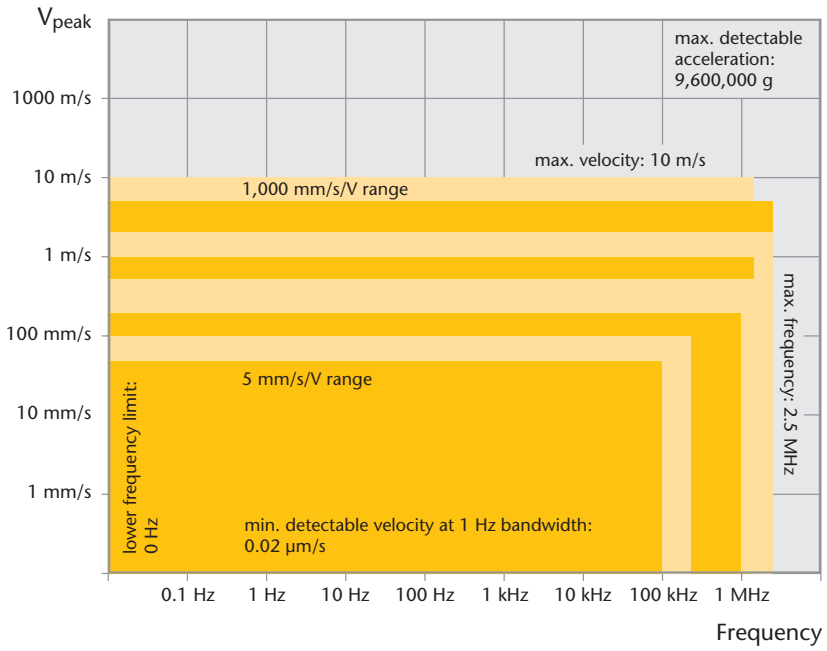
The VD-09 velocity decoder is designed to acquire vibrations in a wide range of frequencies from 0 up to 2.5 MHz. With a velocity limit of up to 10 m/s it is suitable for a wide range of applications and fits perfectly to the complete range of Polytec's OFV sensor heads. Also minute amplitudes can be resolved due to the low noise of the digital decoding technique. For direct displacement decoding the VD-09 can be combined with a DD-900 displacement decoder.

VD-09 Technical Data

Measurement Range	Full Scale Output (Peak)*	Typical Resolution**	Signal Frequency Range	Max. Acceleration
mm/s/V	m/s	µm s^{-1} / √Hz	kHz	g
5	0.05	0.02	0 … 100	3,200
10	0.1	0.04	0 … 250	16,000
20	0.2	0.12	0 … 1000	128,000
50	0.5	0.18	0 … 1500	480,000
100	1	0.2	0 … 1500	960,000
200	2	0.5	0 … 2500	3,200,000
500	5	0.6	0 … 2500	8,000,000
1,000	10	0.7	0 … 1500	9,600,000

* The full scale values correspond to the maximum output voltage of 10 V_{peak}.

** The resolution is defined as the signal amplitude (rms) that produces 0 dB signal/noise ratio with 1 Hz spectral resolution at 50 % f_{max}.



Data Acquisition

For PC-based data acquisition and processing we recommend our VibSoft Packages. VibSoft M2-40 is a comprehensive software including data acquisition board for dual channel data acquisition at 40 MHz bandwidth best suited for the VD-09 decoder. For more information on selection and combination of signal decoders please see OFV-5000 Vibrometer Controller and Decoder Guidelines data sheets, or contact your local sales/application engineer. The data sheets can be downloaded from **www.polytec.com** or can be requested at your local Polytec Office.

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