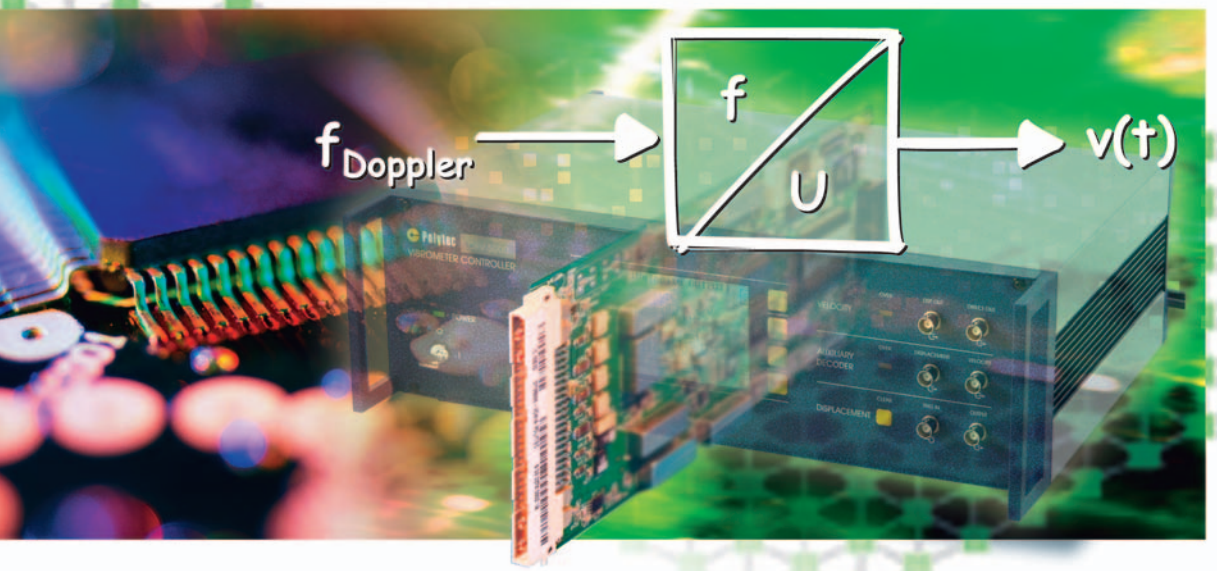
VD-02 *Velocity Decoder*



MODULAR VIBROMETER SYSTEM

- OFV-5000 Vibrometer Controller
  - Velocity Decoders
  - Displacement Decoders
- OFV-505/503 Standard Sensors
- OFV-521/522 Fiber-Optic Sensors

MEASURING VIBRATION VELOCITY

Signal processing is one of the most sensitive parts of any Laser Doppler Vibrometer system. The quality of dedicated velocity decoders available for the OFV-5000 Controller defines the accuracy, linearity, sensitivity and signal-to-noise ratio of the system.

Velocity Decoding in Laser Vibrometer Systems

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

A vibrometer system comprises controller electronics and a non-contact standard-optic or fiber-optic sensor head. The controller provides signals and power for the sensor head, and processes the vibration signals. These are electronically converted by specially developed decoders within the controller to obtain velocity and displacement information about the test structure.

A vibrometer system based on the OFV-5000 Controller can measure vibration frequencies from 0 Hz up to 20 MHz. Velocities can be as small as 0.1 µm/s up to 10 m/s. Different measurement ranges demand appropriate decoders. To meet this demand Polytec offers a range of analog and digital decoders with different characteristics. Two velocity decoders can be operated simultaneously.

The VD-02 Wide-Bandwidth Velocity Decoder

The VD-02 is the most popular velocity decoder. Its high bandwidth (1.5 MHz) and high amplitude ranges (velocity 10 m/s and acceleration 9,600,000 g) make it ideal for most technical applications. The VD-02 can be installed side-by-side with the VD-06 digital velocity decoder (recommended combination) or the VD-01 velocity decoder.

Key Features of the VD-02

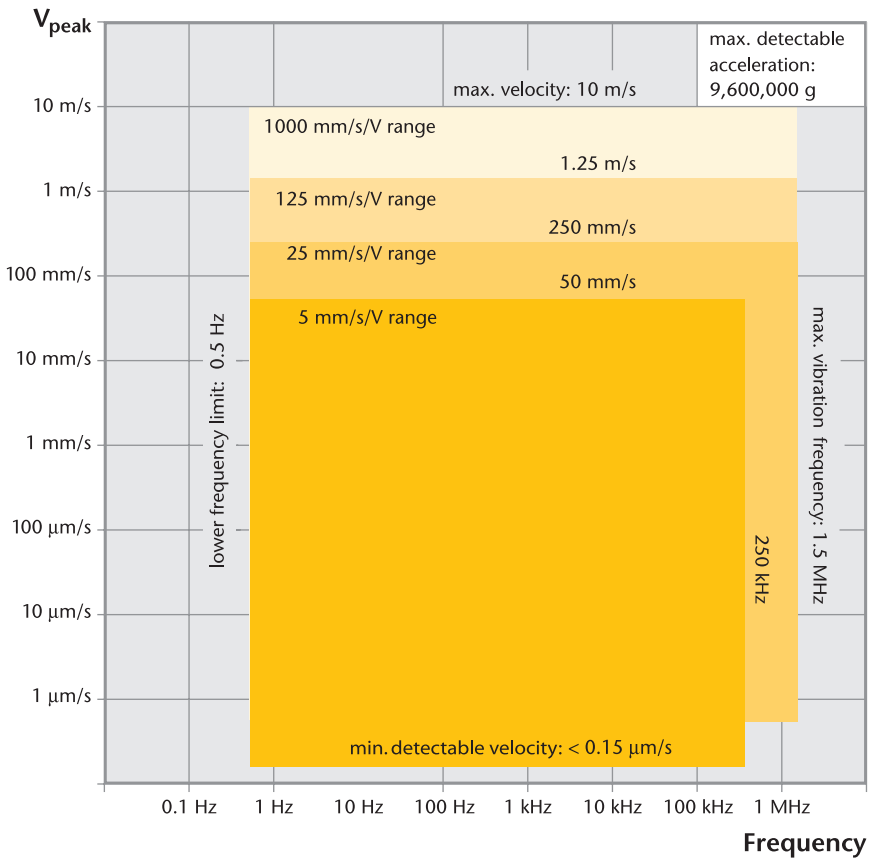
- Upper frequency limit of 1.5 MHz for applications in the acoustical and ultrasonic frequency range
- Very high linearity and low noise level
- Excellent amplitude and phase frequency response
- 4 measurement ranges: 50 mm/s, 250 mm/s, 1.25 m/s and 10 m/s full scale peak
- Best resolution: < 0.15 µm $s^{-1}/\sqrt{Hz}$

VD-02 Technical Data

Measurement Range	Full Scale Output (Peak)*	Resolution**	Signal Frequency Range	Max. Acceleration	Max. Linearity Error
mm/s/V	m/s	µm $s^{-1}/\sqrt{Hz}$	Hz	g	% of reading
5	0.05	0.15	0.5 – 250 k	8,000	1.0
25	0.25	0.50	0.5 – 1,500 k	240,000	1.5
125	1.25	0.60	0.5 – 1,500 k	1,200,000	1.0
1,000	10.00	2.50	0.5 – 1,500 k	9,600,000	1.0

* 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}.

VD-02 Range Diagram



Data Acquisition

For PC-based data acquisition and processing we recommend our VibSoft Packages. VibSoft-1000 is a comprehensive software for dual channel data acquisition at 1 MHz bandwidth best suited for the VD-02 decoder. Four channels are accessible by using VibSoft-1004. For lower frequencies up to 80 kHz we recommend VibSoft-80 and VibSoft-84, resp.

For more information on selection and combination of signal decoders please see OFV-5000 and Decoder Guide data sheets, or contact your local vibrometer sales/application engineer.