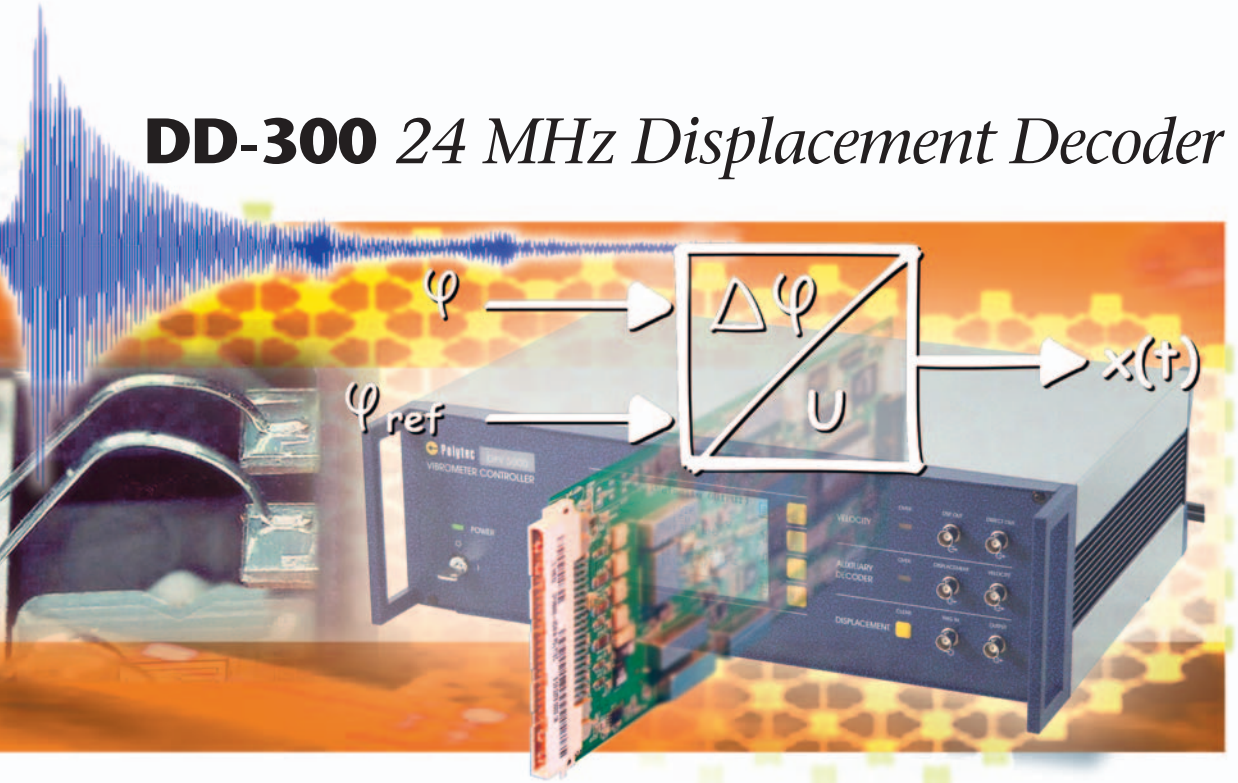
Polytec

DD-300 *24 MHz Displacement Decoder*



MODULAR VIBROMETER SYSTEM

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

MEASURING ULTRASONIC DISPLACEMENTS

Signal processing is one of the most sensitive parts of any Laser Doppler Vibrometer system. The DD-300 Displacement Decoder has been specifically developed to meet the exacting requirements for acquiring ultrasonic vibrations and impulses.

Displacement 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 data. 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 DD-300, DD-400 and DD-600 Displacement Decoders have been developed as auxiliary decoders for specific measurement applications, working independently of the other decoders installed in the controller.

The DD-300 Ultrasonic Displacement Decoder

This decoder allows measurements of vibrations and pulse displacements with amplitudes up to 75 nm (peak) in a frequency range of 30 kHz to 24 MHz. With these specifications the DD-300 can make amplitude measurements on ultrasonic transducers, detect ultrasonic pulses (laser ultrasonic receiver for NDT) and measure fast transient motion on MEMS devices. Furthermore, a special technique which suppresses low frequency (acoustic) vibrations allows high frequency measurements in a normal environment without the clutter and distraction of ambient vibrations.

Key Features of the DD-300

- Large bandwidth from 30 kHz to 24 MHz for acquisition of ultrasonic signals
- Extraordinary resolution of 0.1 pm/$\sqrt{\text{Hz}}$ at 100% reflectivity
- Additional low-pass filtered output with 2 MHz cutoff frequency

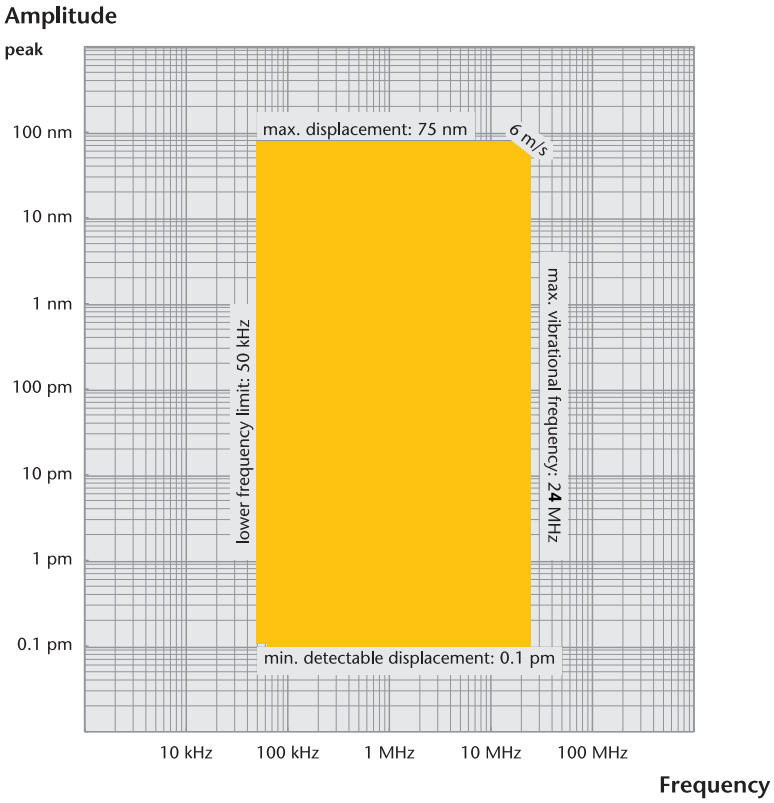
DD-300 Technical Data

Measurement Range	Full Scale Output (peak-to-peak)[1]	Resolution[2]	Signal Frequency Range[3]	Maximum Velocity
nm/V	nm	pm/√Hz	MHz	m/s
50	150	0.1	0.03 ... 24	6

[1] The full scale value corresponds to the output voltage swing of ± 1.5 V at load resistance 50 Ω.

[2] The noise-limited resolution is defined as the signal amplitude (rms) that produces 0 dB signal-to-noise ratio with 1 Hz spectral resolution at 100 % reflectivity.

DD-300 Range Diagramm



Data Acquisition

For PC-based data acquisition and processing we recommend our VibSoft Packages. VibSoft-M2-40 is a comprehensive software best suited for the DD-300 decoder for acquiring the vibrometer digital output signal. It features data acquisition in time and frequency domain, digital filters, signal averaging and real-time integration and differentiation.

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.

Technical specifications are subject to change without notice. OM_DS_DD-300_20010_07_PDF_E