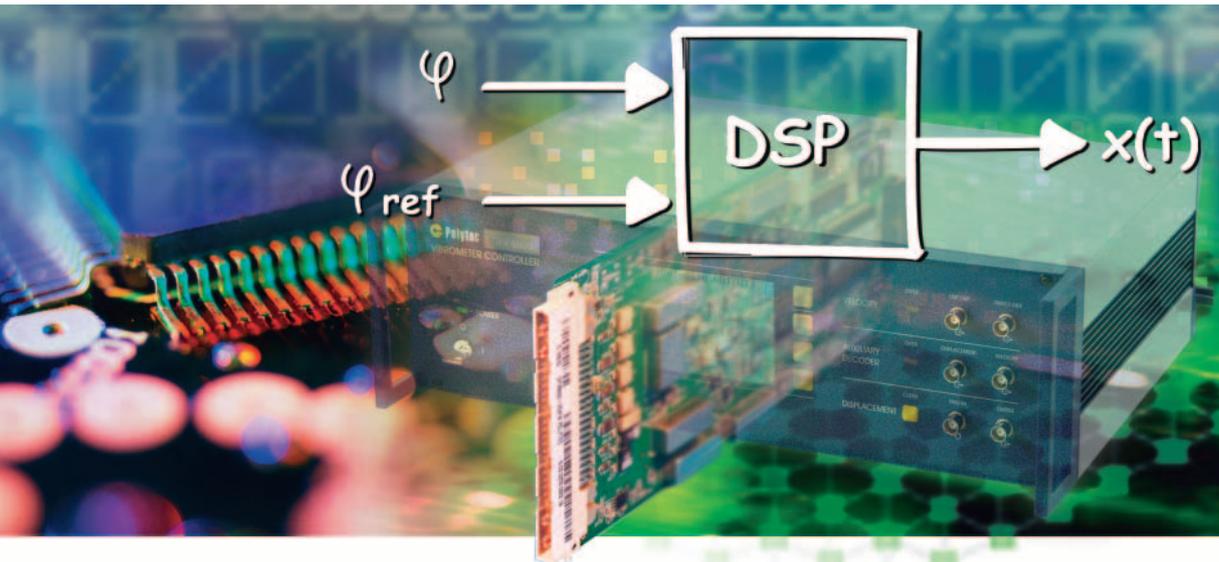


# DD-900 Digital Displacement Decoder



## 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

## Measuring vibration displacement

Signal processing is one of the most sensitive parts 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 decoder. The DD-900 is a high resolution and high frequency digital displacement decoder, which builds a matching pair with the full range VD-09 velocity decoder.

### Displacement Decoding in Laser Vibrometer Systems

Polytec Laser Vibrometers measure the instantaneous velocity and displacement of a vibrating test structure from the Doppler shift in the frequency of back-scattered laser light. 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. Specially developed decoders electronically convert the raw vibration signal to obtain velocity and displacement information about the test structure. An OFV-5000 based vibrometer system can measure vibration frequencies from 0 Hz up to 24 MHz and displacements from picometers to meters. Different measurement ranges demand appropriate decoders. To meet this demand Polytec offers a range of displacement decoders with different characteristics.

### The DD-900 Digital Displacement Decoder

The DD-900 is based on state-of-the-art DSP technology with an excellent displacement resolution of 15 pm. DC capability, a high cutoff velocity of 10 m/s and the operating frequency range of 0 Hz to 2.5 MHz make it an indispensable extension for the unique capabilities of the VD-09 full range velocity decoder (prerequisite for operation). Applications like measuring high-speed switching will become less challenging.

#### DD-900 Key Features

- Digital precision
- 0 – 2.5 MHz bandwidth
- 15 pm maximum resolution
- 10 m/s maximum velocity
- 16 measurement ranges

## DD-900 Technical Data

Measurement Range	Full Scale Output (peak to peak) <sup>1)</sup>	Resolution <sup>2)</sup>	Signal Frequency Range <sup>3)</sup>
$\mu\text{m}/\text{V}$	$\mu\text{m}$	nm	kHz
0.05	1	0.015	0 ... 2,500
0.1	2	0.03	0 ... 2,500
0.2	4	0.06	0 ... 2,500
0.5	10	0.15	0 ... 2,500
1	20	0.3	0 ... 2,500
2	40	0.6	0 ... 2,500
5	100	1.5	0 ... 2,500
10	200	3	0 ... 2,500
20	400	6	0 ... 2,500
50	1,000	15	0 ... 2,500
100	2,000	30	0 ... 2,500
200	4,000	60	0 ... 2,500
500	10,000	150	0 ... 2,500
1,000	20,000	300	0 ... 2,500
2,000	40,000	600	0 ... 2,500
5,000	100,000	1,500	0 ... 2,500

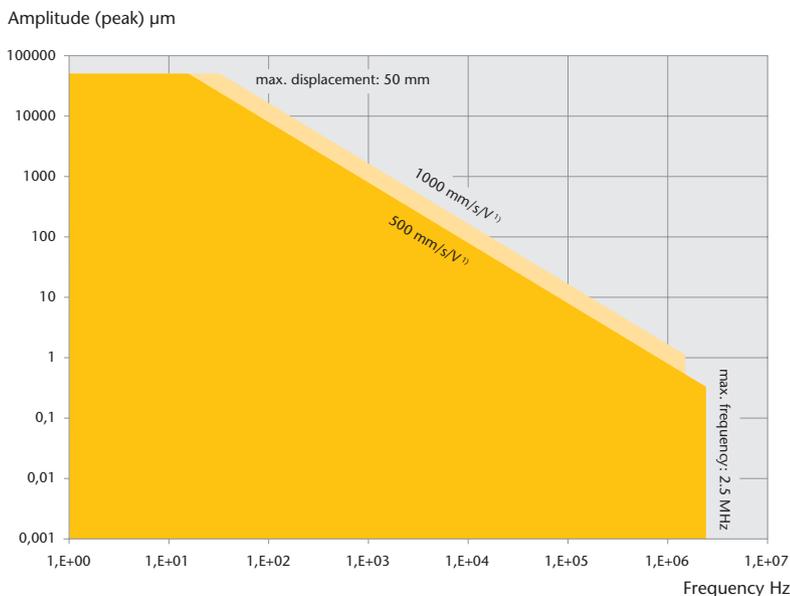
<sup>1)</sup> The full scale values correspond to  $\pm 10$  V (peak-to-peak) maximum output voltage.

<sup>2)</sup> The resolution corresponds to the quantization step of approx. 0.4 mV at the analog output.

Noise-limited resolution:  $< 0.5 \text{ pm}/\sqrt{\text{Hz}}$  (the noise-limited resolution is defined as the signal amplitude (RMS)

at which the signal-to-noise ratio is 0 dB with 1 Hz spectral resolution, measured on 3M Scotchlite Tape (reflective film).

<sup>3)</sup> When a suitable measurement range has been selected for the digital velocity decoder.



<sup>1)</sup> Velocity limit is determined by measurement range of VD-09 velocity decoder, which is required for operation of the DD-900. For further measurement ranges see respective data sheet.

## 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 DD-900 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](http://www.polytec.com) or can be requested at your local Polytec Office.

**Polytec GmbH (Germany)**  
Polytec-Platz 1-7  
76337 Waldbronn  
Tel. +49 7243 604-0  
Fax +49 7243 69944  
info@polytec.de

**Polytec France S.A.S.**  
Bâtiment Orion – 1<sup>er</sup> étage  
39, rue Louveau  
92320 Châtillon  
Tel. +33 1 496569-00  
Fax +33 1 57214068  
info@polytec.fr

**Polytec Ltd. (Great Britain)**  
Lambda House, Batford Mill  
Harpenden, Herts AL5 5BZ  
Tel. +44 1582 711670  
Fax +44 1582 712084  
info@polytec-ltd.co.uk

**Polytec Japan**  
Arena Tower, 13<sup>th</sup> floor  
3-1-9, Shinyokohama,  
Kohoku-ku, Yokohama-shi,  
Kanagawa, 222-0033  
Tel. +81 45 478-6980  
Fax +81 45 478-6981  
info@polytec.co.jp

**Polytec, Inc. (USA)**  
North American Headquarters  
16400 Bake Parkway  
Suites 150 & 200  
Irvine, CA 92618  
Tel. +1 949 943-3033  
Fax +1 949 679-0463  
info@polytec.com

Central Office  
1046 Baker Road  
Dexter, MI 48130  
Tel. +1 734 253-9428  
Fax +1 734 424-9304

East Coast Office  
25 South Street, Suite A  
Hopkinton, MA 01748  
Tel. +1 508 417-1040  
Fax +1 508 544-1225