

# Vibration measurement

## Digital Laser Doppler Vibrometer: Vector-Series

- easy to use
- non-contact
- non-reactive
- precise



High optical sensitivity

Ultra fast digital signal processing (UltraDSP)

Perfect handling

Bandwidth up to 10 MHz digital real-time

Exchangeable objective lenses

Excellent resolution up to 2.5 nm/s and 2 pm





## Laser Doppler Vibrometer

### Compact design with:

- laser, interferometer
- vibrometer controller
- up to three decoder



### Digital Signal Processing:

- highest resolution
- up to 10 MHz bandwidth
- excellent linearity



### Easy to use:

- color touch screen
- control knobs
- up to 3 outputs



OptoMET Laser Doppler Vibrometers (LDV) are fast and easy to operate. They are used for precise, non-contact, and non-reactive measurements of mechanical and acoustic parameters such as vibration displacement, velocity, and acceleration.

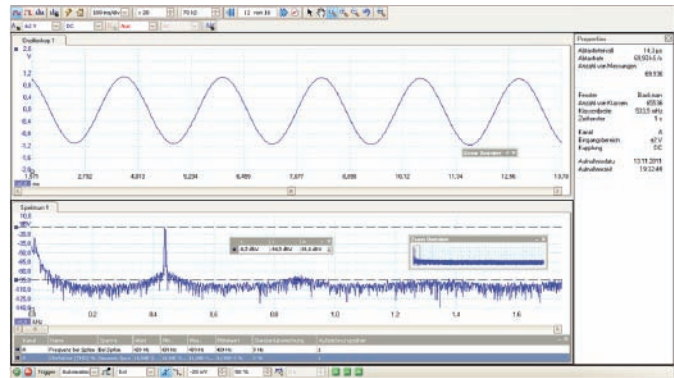
With the launch of the LDV Vector-Series, OptoMET has taken the lead in digital broadband real-time laser Doppler vibrometers. OptoMET developed the ultrafast digital signal processing technology (ultraDSP) for these vibrometers in order to achieve extremely fine resolutions of up to 2.5 nm/s (velocity) and 2 pm (displacement), excellent bandwidth (up to 10 MHz) and a wide dynamic range up to  $\pm 10$  m/s and  $\pm 32$  million g.

### Compact yet extremely powerful

- Ultrafast digital signal processing (ultraDSP)
- Highest bandwidth up to 10 MHz for real-time digital LDV
- Excellent resolution up to 2.5 nm/s and 2 pm
- Easy and quick-change objective lenses for optimum working distance
- Compact design optics (interferometer) and electronics (decoder) in a single housing
- Variety of different decoders (displacement, velocity and acceleration)
- Excellent linearity and measuring accuracy
- High optical sensitivity
- User friendly interface with color touch screen and knobs
- Up to 3 Analog voltage outputs via standard BNC connectors



# Application



## Vibration / Motion Measurement

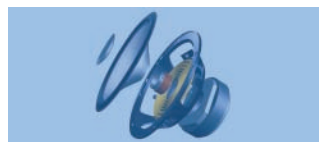


These powerful measuring systems are suitable for challenging metrological tasks in research, development, and production. Applications include frequency/resonance analysis (e.g. machines, civil engineering structures, and automotive components), order analysis of engines, testing of materials, and quality assurance.

In addition, the instruments can be set up and made ready for operation very quickly, both in the laboratory and in the field, vibrations can be visualized in just a few minutes.



**Automotive**  
drives, engine, brake,  
body parts, exhaust  
piezo actuators



**Acoustic & Ultrasonic**  
Noise testing of power tools,  
home appliances, ...  
Loudspeaker Design



**Aerospace industry**  
construction verification,  
materials characterization,  
FEM-model validation



**Material Testing**  
crack Detection,  
structure test,  
Natural frequency-  
measurement

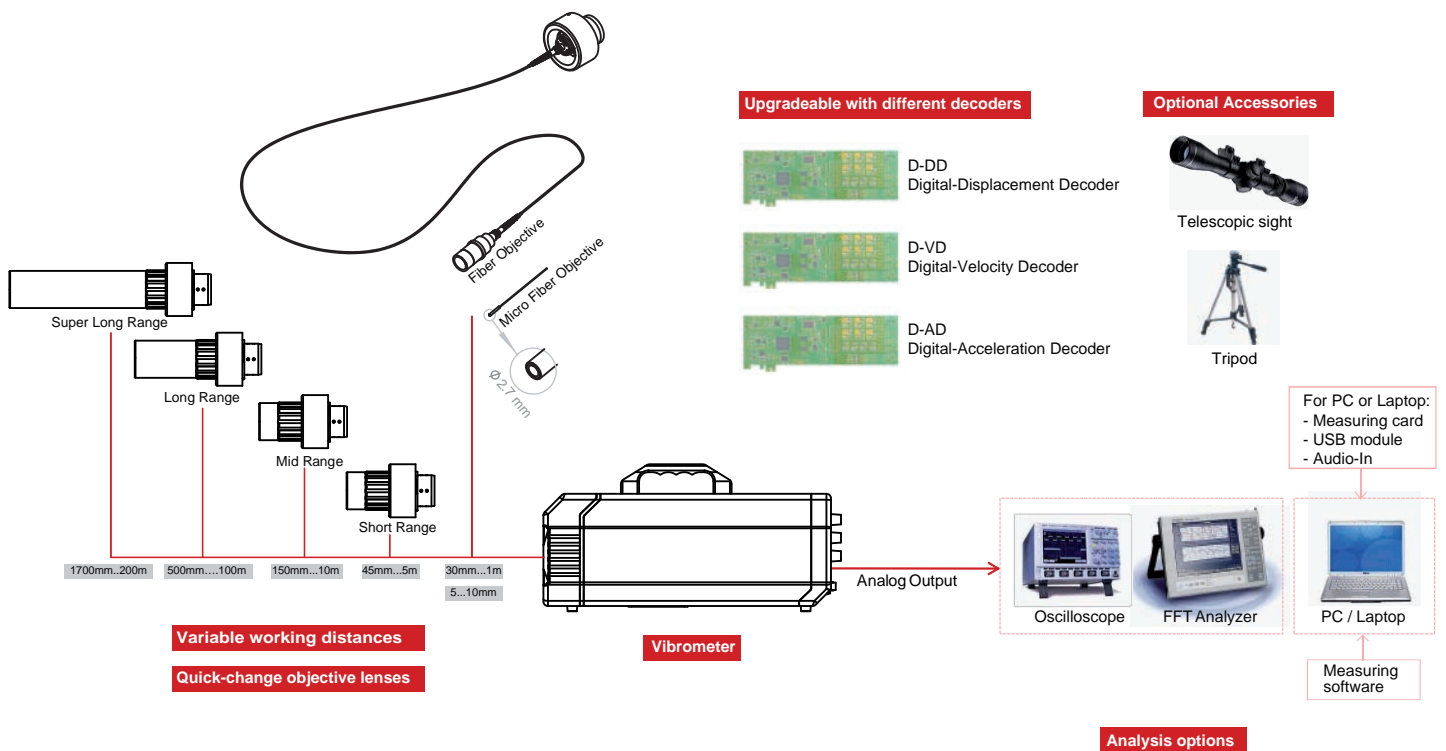
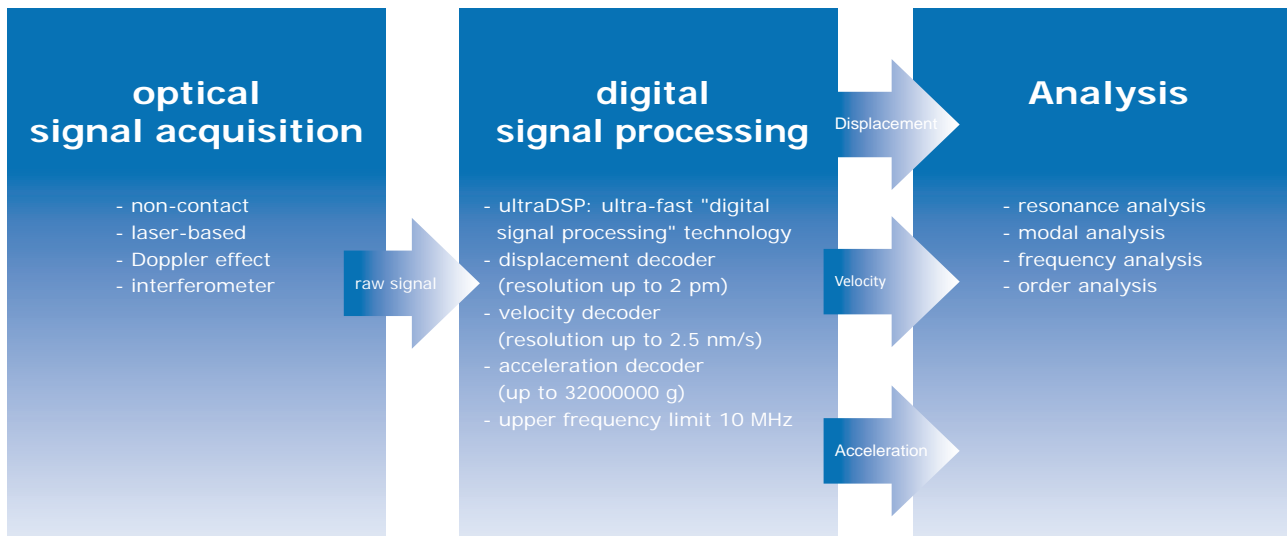


**Product Development  
& Manufacturing**  
development tools,  
end-of-line inspection electric-  
motors, pumps, Fans,  
gear boxes



**MEMS / Microstructures**  
optimizing the frequency response,  
Vibrational analysis,  
Dynamic characterization

## Set up / Measurement / Analysis



## Technical data

### General data

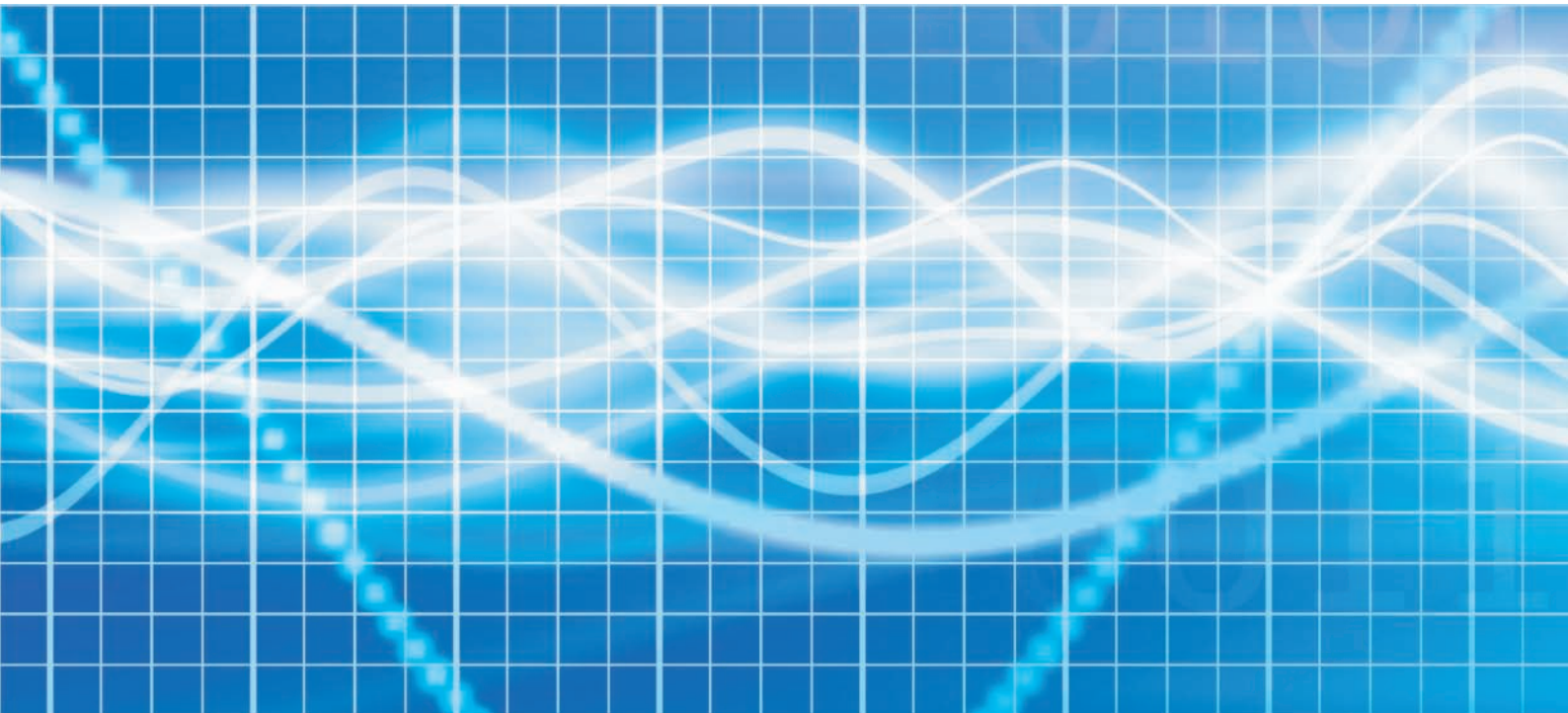
measured quantity	velocity, displacement and acceleration
signal processing	digital (OptoMET UltraDSP Technology)
measuring Range vibration velocity	0 to 10 m/s
number of Ranges vibration velocity	up to 14 (0.001 / 0.002 / 0.005 / 0.01 / 0.02 / 0.05 / 0.1 / 0.2 / 0.5 / 1 / 2 / 5 / 8 / 10 m/s)
vibration velocity resolution	up to 2.5 nm/s
frequency range	up to 10 MHz
output signal	analog, standard BNC connector
output voltage range	± 2V @ 1 MOhm / ± 1V @ 50 Ohm
source impedance	50 Ohm
working distance	Variable working distance from 5 mm to >100 m 6 exchangeable lenses
laser wavelength	633 nm, visible, red laser beam
laser safety class	Output power: 1 mW, eye safe, Class II
user interface output	color screen 3.5 "+ 20 segment LED bargraph
user interface input	touch screen, knobs with push-button, key switch (power), switch (laser ON/OFF)
dimensions	length x width x height (excluding handle and lens): 370 x 120 x 100 mm
weight	8 kg + objective lens
power supply	110 -240V AC (50-60Hz) or 12V DC

## Vector-Series configuration

Type	Decoder	Measuring ranges	Full Scale (Peak) m/s	Frequency range	Resolution
Vector-Basis	D-VD-1	8	2	up to 500 kHz	8 nm/s
Vector-Sense	D-VD-2	11	2	up to 1 MHz	2.5 nm/s
	D-DD-2	19		DC - 1 MHz	2 µm
Vector-Speed	D-VD-3	11	10	up to 2.5 MHz	8 nm/s
	D-DD-3	19		DC - 2.5 MHz	2 µm
Vector-HF	D-VD-4	9	5	up to 10 MHz	8 nm/s
	D-DD-4	19		DC - 10 MHz	2 µm
Vector-Master	D-VD-5	14	10	up to 10 MHz	2.5 nm/s
	D-DD-5	19		DC - 10 MHz	2 µm
	D-AD-5	14		up to 10 MHz	1.8 µg
Vector-Individually	Decodern-Optionen: D-VD-1 bis 5, D-DD-1 bis 5, D-AD-1 bis 5				

## Vector-Series objective lenses

Objective lenses	M-F-OBJ	F-OBJ	OBJ-SR	OBJ-MR	OBJ-LR	OBJ-SLR
	Micro Fiber Objective	Fiber Objective	Short Range	Mid Range	Long Range	Super Long Range
Focal length (mm)	2	40 / 60 / 100	25	50	100	200
Min. stand-off distance (mm)	5	30 / 50 / 90	45	150	500	1700
Min. spot size in µm	9	5.8 / 8.8 / 12.9	25	30	65	85
Working distance	5 ... 10 mm	30 mm ... 1 m	45 mm ... 5 m	150 mm ... 10 m	500 mm ... 100 m	1700 mm ... 200 m



The OptoMET GmbH is located in Darmstadt, a scientific City in the center of Germany. Only 30 kilometers away from Frankfurt airport.

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