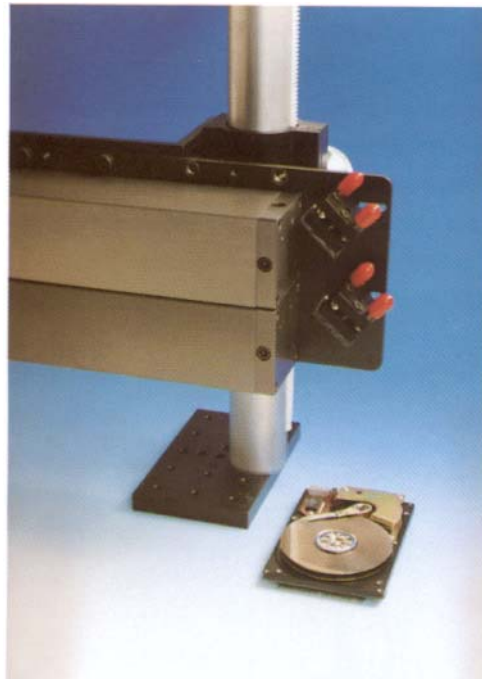


Laser Doppler Displacement Meter

VS-5020



Non-Contact High Sensitivity Vibration Sensor Model VS-5020

Optodyne's VS-5020 Vibration Sensor is a noncontact, highly sensitive means of measuring displacement, velocity, and acceleration. Performing as a storage oscilloscope for mechanical vibration, the VS-5020 meets precision engineering requirements of microelectronic, aerospace, automotive, and

R&D applications. A two-axis system, the [VS-5020](#) provides measurement accuracy of 1 ppm, resolution to 0.1 microinch, speed up to 200 in/sec, and frequency response from do to 400 kHz. The extremely high signal-to-noise ratio of this two-axis system permits the user to measure simultaneously both target and background phenomena, while maintaining the integrity of each measurement.

MAJOR FEATURES AND BENEFITS

- Compact and light-weight
- Non-contact and high sensitivity
- Simple setup and operation
- Variable standoff (few mm to few meters)
- Small beam spot diameter (10-100 micrometers)
- 2 channels for differential or orthogonal measurement
- High resolution, high repeatability, high data rate, and high signal-to-noise ratio
- No calibration factor, no interference, no minimum velocity, no non-linear effects, and no range switch
- Computer data storage and processing

Major Applications

- Non-intrusive dynamic measurement for disk drives, heads and VCM.
- Measurement and analysis of complex motions for printer heads, disk drives and stepper rnotors, XY-tables, and bearings. .
- Measurement of settling time and dynamic properties of slides, ball screws, stages and spindles.
- Calibration of transducers, accelerometers, probes and shakes.

Specifications

Modular in design, the [VS-5020](#) may be configured to handle a wide variety of measurement applications. Because the system is immune to electromagnetic interference, it is useful in many electronic environments where vibration measurement has traditionally been difficult to obtain. The VS5020 operates on polished surfaces of almost any material -- metallic, non-metallic, composite, plastic, glass or ceramic. The system's software will analyze the collected data, or the data may be transported to other analyzers such as FFT's.

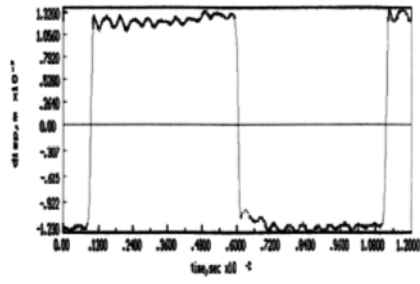


Fig. 1. Motion of the magnetic head of a small hard disk drive

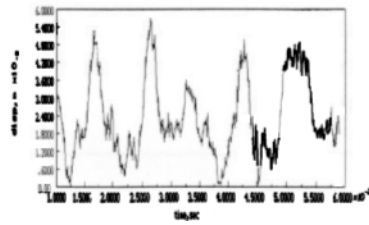


Fig. 2. Typical spindle runout of a hard disk drive at 3600 rpm

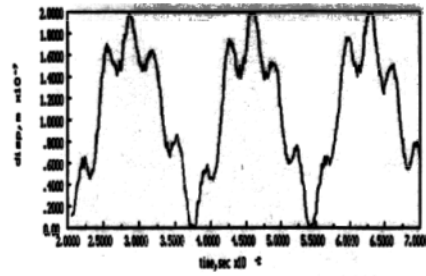


Fig. 3. Typical magnetic head flight height variation

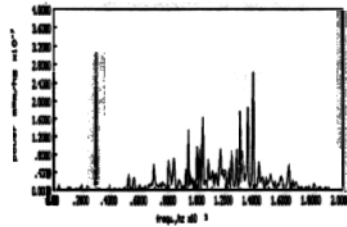


Fig. 4. The power spectra density of figure 3

SYSTEM DESCRIPTION

Major elements of the VS-5020 include two LDDM™ laser head assemblies, steering mirrors, a processor module, IBM-compatible 386 computer, software, carrying case, and accessories.

Model VS-5020 Specifications

Sensitivity:	
Displacement resolution:	2.5 nm (0.1 μinch)
Min, return light:	1 microwatt
Beam diameter:	5 mm
(with lens)	(10 to 100 μm)
Data rate:	6.25 to 800 K data/sec
Record size:	64K points/record or 128 kbyte/record
Target Surface:	Reflectivity >4%
Surface finish.	polished to 1-2 μinch
Surface flatness,	10 μinch over beam spot
Ranges:	
Displacement:	2.5 nm to 5 m
Velocity:	0.5 m/s
Acceleration:	0-100,000 g
Number of Channels:	2
Trigger Mode:	Pre or Post-trigger
Output interface:	Up and down pulses (TTL) Analog Phase (0-2.5 V)
Analog output:	0-10 V with D/A board
Power:	90-230 VAC. 50-60 Hz