

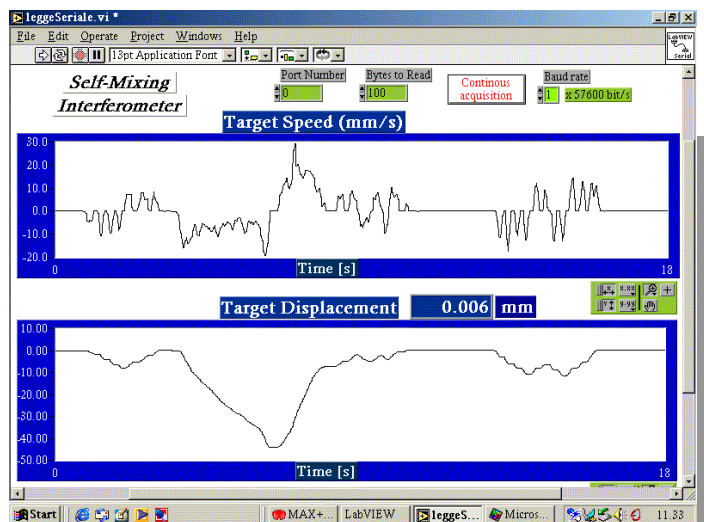
LASER INTERFEROMETER

- **NON-CONTACT DISPLACEMENT MEASUREMENT**
- **PC INTERFACED BY RS232**
- **SUB-MICROMETER RESOLUTION**
- **OPERATION RANGE: UP TO 1M**
- **MAXIMUM TARGET SPEED 10CM/S**
- **DIGITAL DISPLACEMENT INDICATOR**
- **NOVEL INTERFEROMETRIC CONFIGURATION**
- **WORKS ON DIFFUSIVE SURFACES**
- **NO NEED OF BEAM ALIGNMENT**

The new Laser Interferometer allows easy and accurate non-contact displacement measurements, without the need of placing mirrors or corner cubes on the target. The displacement is shown by an indicator in metric unit. The instrument also provides a digital output by RS232, which can be read by Labview™ software. A speckle-tracking system allows the operation over diffusive targets, by overcoming the problem of signal fading.

The displacement is shown by the instrument indicator and is transmitted to a PC by RS232. A LED indicates wrong measurement cases (signal loss, excessive target speed or laser beam obstruction). There is no need of alignment procedures.

PERSONAL COMPUTER SCREEN SHOT: THE VIRTUAL INSTRUMENT



PRELIMINARY

PRINCIPLE OF OPERATION

The new Laser Interferometer is based on a novel and simple self-mixing interferometric scheme, and it uses a semiconductor diode laser. The Michelson interferometric configuration used in conventional Laser Interferometers includes several lenses, polarizing beamsplitters, waveplates and dual balanced photoreceiver. Conversely, the new self-mixing scheme is based on the coherent interference of the backscattered light directly into the laser diode cavity, and it needs a reduced set of optics and a single photodetector. The target displacement is reconstructed from the interferometric signal by an electronic elaboration. The interferometer incorporates a system for maximizing the optical signal: the speckle-tracking, which moves the spot position over the target of few micrometers, following the bright speckle. Therefore the instrument can work also with diffusive targets, without the need of time-consuming alignment procedures.

APPLICATIONS

- Non-contact measurement of displacement
- Vibration measurement (from μm to cm)
- On-line process control in industrial plants

USE

The optical head shall be placed in front of the moving target (operating distance from 20 cm to 1 m).

PROPERTIES

Technical	
Resolution	0.4 μm
Accuracy	10^{-5}
Dynamic Range	1 m
Maximum Target Speed	10 cm/s
Physical	
Laser power	30 mW
Laser wavelength	785 nm
Laser safety class	III B
Output signals	• Digital displacement
Output connectors	RS232
Front panel displays	• Displacement • ON-OFF Led • Error Led
Front panel switches	• Laser: ON/OFF • Speckle Tracking ON/OFF
Optical head dimensions	170 x 150 x 100 mm (L x W x H)
Optical head weight	1.1 kg
Electronic unit dimensions	250 x 270 x 70 mm (L x W x H)
Electronic unit weight	1.6 kg
Power supply	220-240 V ac / 50-60 Hz



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