



Measurement of 3D Thermal expansion and Thermal strain of electronic components.

# Full-Field Measurement for Advanced Material Testing

## 3D-ESPI System Q-300

The 3D-ESPI System Q-300 is designed for complete three dimensional and highly sensitive displacement and strain analysis of materials and components.

### Quantitative full-field and 3D-Analysis

Q-300 has successfully been used in development and testing of complex (anisotropic) materials, components and structures in electronics, automotive design, machining and materials research. It is ideal for the experimental verification of analytical and numerical calculation techniques.

The 3D information enables fast determination of the material properties (Young's modulus, Poisson ratio, etc.).

### Wide field of Applications

Q-300 is being used in advanced tensile tests, fracture mechanics, bending tests, applications, biaxial tests,

creep investigations, thermal expansion, and many more. The measurement is performed non-contact, on the whole measuring area and on any material. No marking is required.

### High accuracy

The fully portable Q-300 Sensor is symmetrically designed, with interchangeable laser illumination arms to maintain different illumination base lengths and sensitivities. Therefore, it can be operated in the 1D-, 2D- or 3D-mode. The zoom lens enables adaptation to different object sizes and geometries. With macro lenses, very small areas can be analyzed as well.

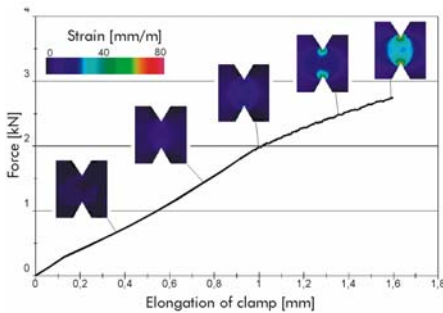
### Modular design for flexible use

The sensor has to be attached in a way to avoid relative movement between sample and sensor. For

this reason, different patented mounting devices can be provided. Q-300 can be used on flat or curved surfaces, due to an optional contour module. The sensor is driven by a robust electronic control system with the complete software package ISTRA. It offers automatic or manual measurement, and quantitative

data analysis of 3D-displacement and strain fields. Sub micrometer accuracy is achieved taking into account the varying sensitivity with different object coordinates.

The specifications in this document are subject to change without notice.



Full field strain maps at any load level (tensile test on notched Al-alloy sample)



3D-ESPI System Q-300



Control Electronic System

Technical Specifications	Q-300
Displacement accuracy	0.03 - 0.1 $\mu\text{m}$ adjustable
CCD-resolution	1380 x 1035 pixels
Measuring range	Adjustable to any measurement range by variation of measurement steps (10 - 100 $\mu\text{m}$ per step depending on measuring direction)
Measuring area	Up to 200 x 300 mm <sup>2</sup> with built in illumination, larger areas with external laser
Working distance	Variable, 0.2...1.0 m
Operation modes	Automatic, manual, 1D-, 2D-, 3D-Operation
Data interface	TIFF, ASCII
Data acquisition speed	3.5 sec per measurement step for 3D analysis
Data analysis	Automatic serial analysis mode or manual at any loading step
Dimensions of sensor head	80 x 130 x 120 mm <sup>3</sup> (without illumination arms)
Weight	2.7 kg (sensor head)
Laser (built in)	Diode, 2 x 70 mW, 785 nm
Control and evaluation unit	Portable-Controller with integrated electronics
Operation system	Windows 2000, XP

Options
Longer illumination arms (for increased sensitivity)
Contour measurement for strain analysis on curved structures
Mechanical support to testing machine and other loading devices
3D-vibration analysis with stroboscopic illumination (as upgrade to Q-500)
Real Time Mode Monitor for Full-Field Visualization of Vibration Modes
Glass fibre coupling of external solid state laser for illumination of large areas (up to 1m <sup>2</sup> )
Gauge function for advanced analysis
Recording of analog inputs such as force, temperature...