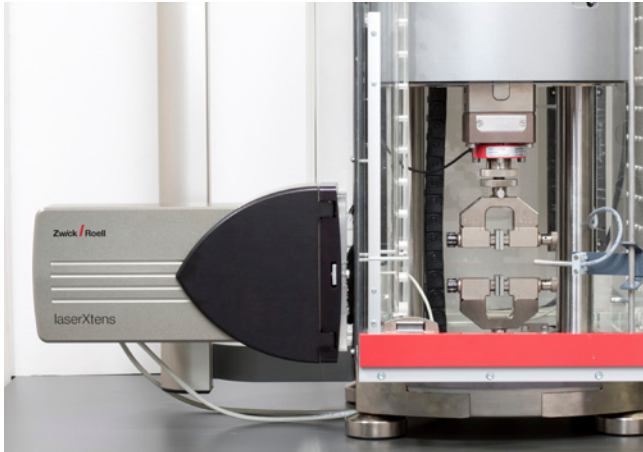


## Product Information

### laserXtens Compact - contact-free and without specimen marking



#### Applicational range

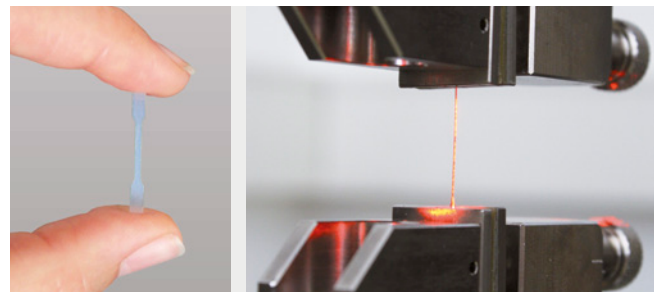
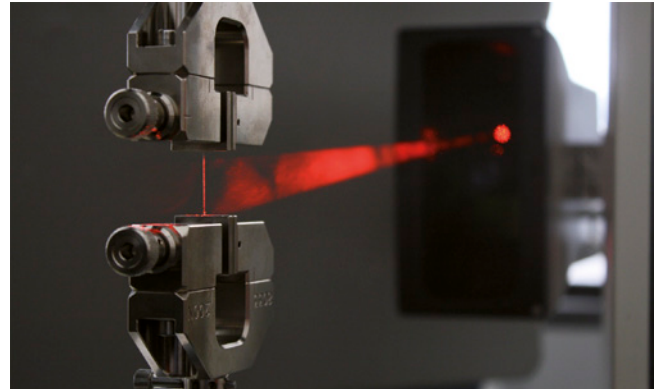
The laserXtens Compact can be used to measure strain or deformation on a wide range of materials. Using the latest laser speckle technology means that there is no contact with the specimen during the test and no need to attach marks. This enables the laserXtens Compact to work in a wide range of applications:

- Tensile, compression and flexure tests on metals and plastics
- Tests on components and subassemblies
- Applications where a contact extensometer might be unsuitable due to its physical contact with the specimen and which might be damaged by the whiplash experienced at specimen failure
- Tests in temperature chambers
- Where non contact biaxial strain measurement is necessary

Flexible – yet easy to operate, the laserXtens Compact is perfectly suited for quality control applications and yet offers major technological benefits to organizations engaged in research and development.

#### Highest precision and resolution

- The laserXtens Compact provides high precision in micro and macro measuring ranges
- The laserXtens Compact meets or exceeds class 0,5 of ISO 9513 (Class B2 of ASTM E83)
- The resolution of the laserXtens Compact HP (for testing machine PrecisionLine Vario) is 0.04  $\mu\text{m}$ . Measuring inaccuracies which may be caused by lateral movements occurring are minimized by the telecentric imaging



#### Smallest specimens are measurable

Easily and with high accuracy you can also perform measurements on small specimen geometries from 1.5 mm gage length or with a specimen width/diameter of 0.5 mm or even smaller after pretests.

#### No specimen contact, no specimen markings

- The laserXtens makes no contact with the specimen and there is no influence on the test caused by the laser light
- The laserXtens does not require specimen markings which results in several advantages:
  - Saving of time - especially at high specimen throughput
  - Simple use in temperature chambers
  - The system can plainly be used in robotic testing systems, as no manual specimen preparation is needed prior to the test

#### Unrivalled functions and options

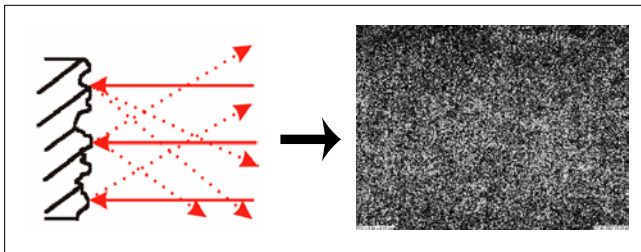
- Measurement of transverse strain or flexion without the need of additional specimen marks or hardware extensions for the system (software option)
- Measurement in two dimensions, up to 100 measuring points in any desired configuration or arranged in matrix form on a plane specimen surface can be dimensioned (option 2D dot-matrix)
- Determination of the strain distribution and the strain at break according to ISO 6892-1 annex H

## Product Information

### laserXtens Compact - contact-free and without specimen marking

#### Function description

The laserXtens Compact consists of one measuring head containing digital camera and laser light source. The specimen is illuminated with the laser light and this generates a speckle pattern on the surface of the test specimen.



The speckle pattern can be thought of as a 'virtual measuring mark' or 'digital fingerprint' on the surface of the specimen and is monitored with the two full frame digital cameras. The laserXtens Compact software tracks this virtual measuring mark in consecutive images taken during the test, and this procedure is called speckle tracking. As load is applied to the specimen by the testing machine the speckle pattern moves and the laserXtens Compact software tracks the speckle pattern iteratively from image to image in real-time and determines the strain in the specimen.

With laserXtens Compact a variable gage length can be set using two virtual gage marks positioned at an appropriate distance within the camera field of view.

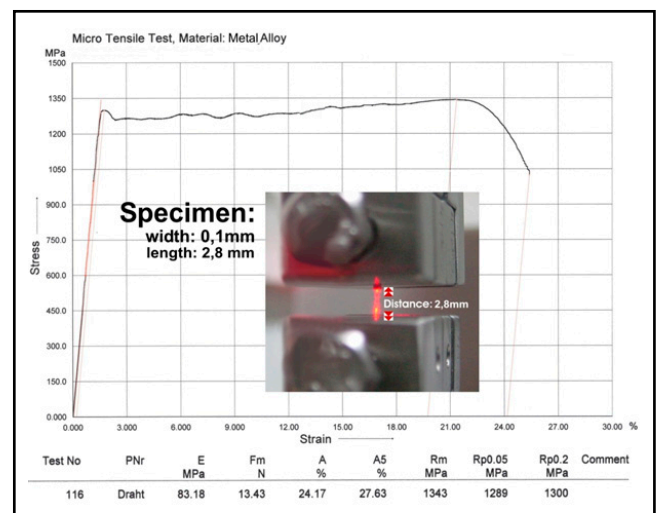
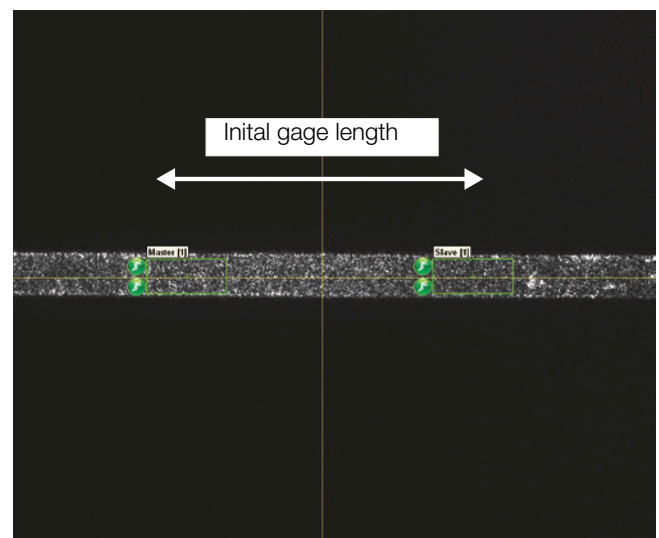
When the specimen is loaded the virtual gage marks are displaced. laserXtens Compact calculates the extension on the specimen from the relative displacement of the gage marks.

The maximum available measurement travel results from the difference between the field of view and initial gage length. Typically a field of view of 16-20 mm is available for measuring purposes.

The algorithm operates in two different modes. As long as the virtual gage mark moves within the field of view it is tracked. As soon as the mark reaches the edge of the view field the system switches to a second measuring mode, in which the flow, and hence the extension, of the material below the evaluation window is measured.

Depending on the material and/or the deformation of the specimen, good results (i.e. Accuracy Class 0.5) are obtained with this method.

Two additional virtual gage marks can optionally be measured in parallel in the transverse direction.



Strain controlled tensile test on micro specimen

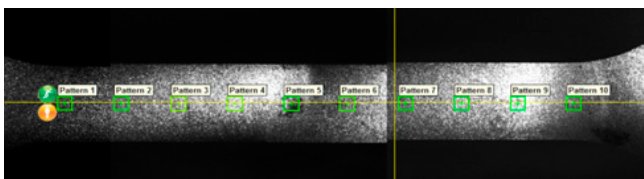
## Product Information

### laserXtens Compact - contact-free and without specimen marking

#### Software options

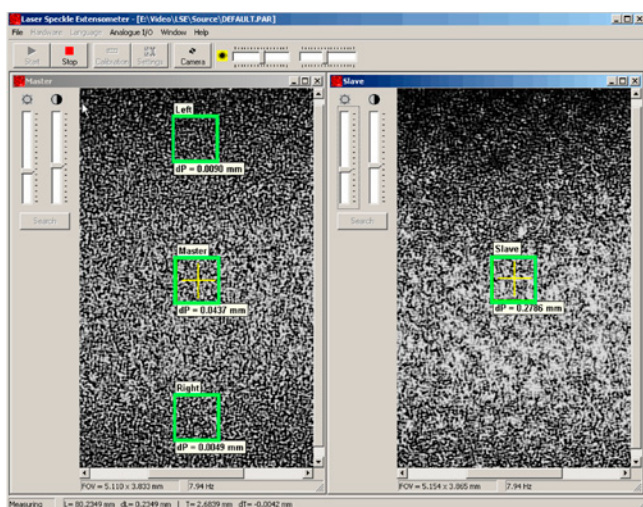
##### Strain distribution

The option strain distribution is used to determine localized strains at several measuring locations along the gage length on the specimen. The evaluation of up to 16 measurement marks is possible. In addition, a balancing of the beginning gage length can be performed in order to follow the necking-in automatically in real time (according to ISO 6892-1, annex H).



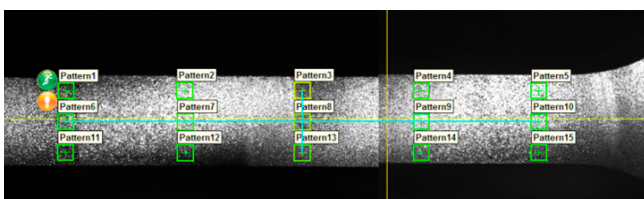
##### Second measurement axis

This option enables the determination of extension and local transverse strain at the same time.



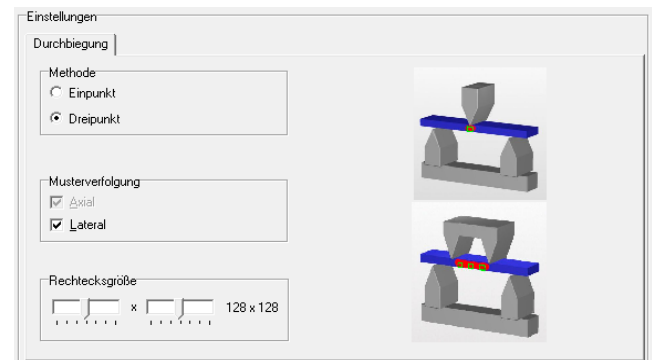
##### 2D dot-matrix

This option enables measurement in two dimensions for measurement points on a plane specimen surface. Thereby it is possible to identify local strains and inhomogeneities of the specimen under strain. X- and Y-coordinates as well as the distances between points are available as measurement values.



#### Measurement of the deflection in 3- and 4-point flexure tests

The laserXtens is also used for 3- and 4-point flexure tests. The measurement can be made in one point (displacement of a measurement point) or at three points (relative displacement of the middle measurement point in relation to the outside points). Maximum measurement basis is 15 mm.



#### Important notice for optimum functionality

Due to physical constraints there are some conditions which must be fulfilled in order to guarantee laserXtens' optimum performance.

- In order to get good speckle patterns the specimen surface needs to adequately reflect the laser light. These conditions are easily achieved for metals and for most plastic materials. If necessary, simple tools can be used to improve the conditions on the specimen surface.
- The specimen grips must ensure that the specimen remains in good axial alignment during the test.
- For safe and accurate operation a low vibration environment is necessary (laboratory conditions).

Particularly for plastics we recommend pretests to ensure the reflection characteristics of the material. Aside from that through the pretests the Zwick test laboratory can determine the optimum configuration for your application.

Zwick guarantees reliable operation of the laserXtens based on pretested specimens and the test conditions (= process reliability).

## Product Information

### laserXtens Compact - contact-free and without specimen marking

	<b>laserXtens Compact</b> <b>029243</b>	<b>laserXtens Compact HP</b> <b>(for PrecisionLine Vario)</b> <b>049390</b>
laserXtens Compact - non contacting extensometer without marks		
Measuring head with automatic gage length setting, 1 digital camera, including lens, red laser light source, software for image acquisition, calculation of cross correlation, <i>testXpert</i> ® II Integration, toolset for calibration		
Laser Class 2: no protective actions are necessary		
Class	0.5 accord. to EN ISO 9513	0.5 accord. to EN ISO 9513
Resolution	0.15 µm	0.04 µm
Measurement range	- up to 13 mm minus gage length via speckle tracking, at test area depth 440 mm, afterwards switching to flow measurement - up to 17 mm minus gage length via speckle tracking, at test area depth 640 mm, afterwards switching to flow measurement	up to 15 mm minus gage length via speckle tracking, afterwards switching to flow measurement
Gage length	1.5 - 13 mm by test area width 440 mm 1.5 - 17 mm by Test area width 640 mm	1.5 - 14 mm
Max. following speed on the specimen	250 mm/min	250 mm/min
Measurement frequency (with basic settings)	100 Hz	70 Hz
Specimens thickness flat specimens	max. 30 mm	max. 30 mm
Diameter round specimens	1 - 30 mm	0.5 - 30 mm

In combination with *testXpert*® II and *testControl* or *testControl* II a free slot in the electronic is required.

<b>Description</b>	<b>Item number</b>
<b>Basic package for laserXtens</b>	<b>various</b>
The basic package includes a multilingual workstation, operating system Windows XP or Windows 7 /32 bit, 23" TFT-screen and a manual in German or English	
<b>Mounting</b>	<b>various</b>
laserXtens Compact: Different holding frames for front-left and rear-left mounting, for all Allround-Line table-top and floor testing machines	
laserXtens Compact HP: Holding frame for mounting left at PrecisionLine Vario	
<b>Options</b>	
Tests in temperature chambers or ovens	<b>on request</b>
<b>Software options</b>	
Second measurement axis for measuring axial strain and a local transverse strain simultaneously	<b>011069</b>
Strain distribution for determination of localized strains at several measuring locations	<b>077063</b>
2D dot-matrix: Measurement in two dimensions for up to 100 measurement points	<b>077070</b>
Measurement of deflection in 3- and 4-point flexure tests in test axis	<b>077071</b>
<b>Stand-alone operation</b>	
High performance AD/DA converter 4 inputs, 2 outputs	<b>021661</b>
High performance D/A converter, 4 outputs	<b>032319</b>