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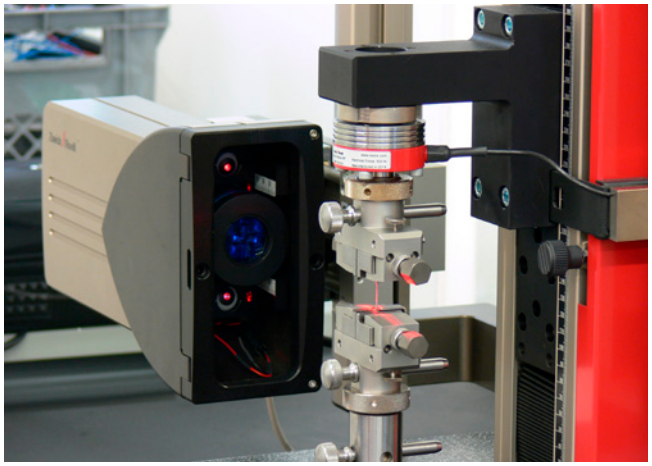
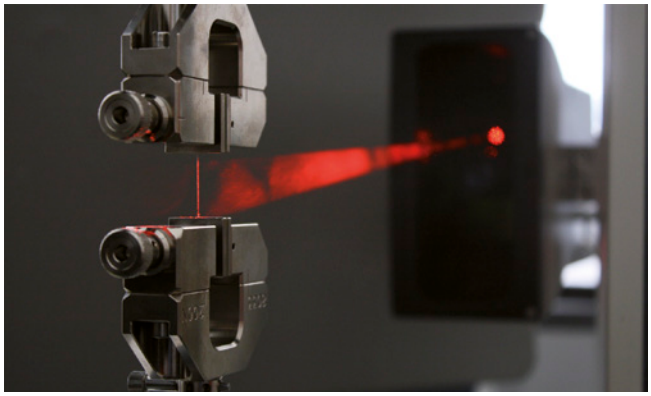
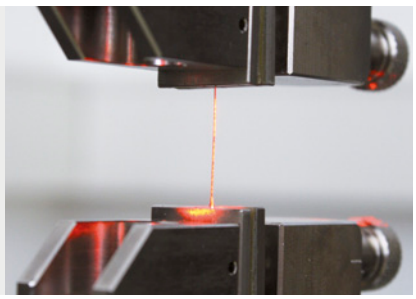
Materials Testing

Product Information

laserXtens Compact - contact-free and without specimen marking







Applicational range
The laserXtens Compact / Compact HP can be used for contact-free and high-precision measurment of strain or deformation on a wide range of materials in a small or micro measurement range. Using the latest laser speckle technology means that there is no contact with the specimen during the test and no need to attach marks.

- 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 / Compact HP 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 / Compact HP provides high precision in micro and macro measuring ranges
- It meets or exceeds class 0,5 of ISO 9513 (Class B2 of ASTM E83)
- The resolution of the laserXtens Compact HP is 0.04 µm. 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 3 mm gage length or with a specimen width/ diameter of 1 mm or even smaller after pretests.

No specimen contact, no specimen markings
- The laserXtens Compact 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

Unrivaled 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

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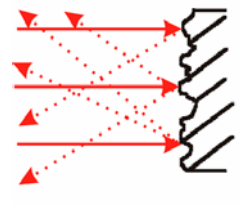
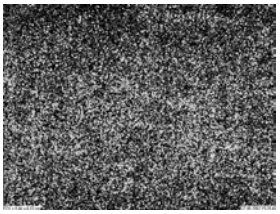
Description of operation
laserXtens Compact / Compact HP consists of a measuring head with a digital camera and one / two laser light source(s). The specimen is illuminated with laser light and a speckle pattern is generated by the reflected laser rays.



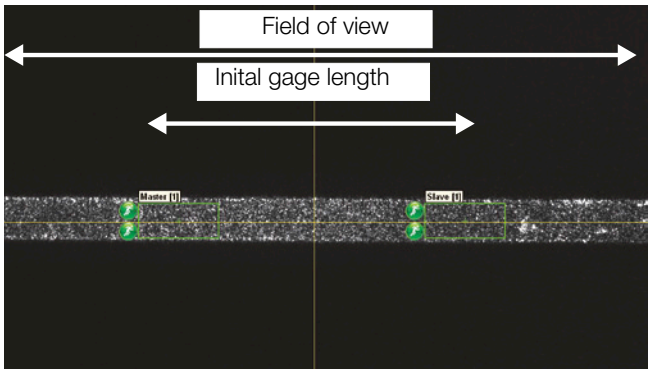
Laser rays reflected on specimens surface



Generated speckle pattern on specimens surface

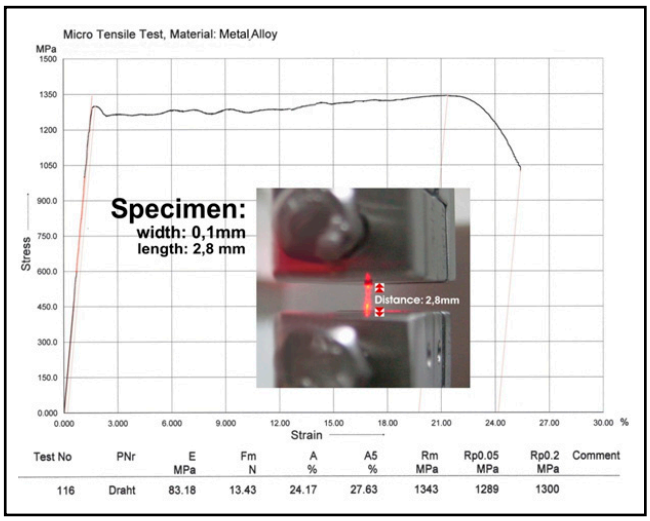
The specimen surface plus speckle patterns are recorded by a full-frame digital camera. Two evaluation windows are positioned within the overall image (= field of view) of the camera as virtual gage-marks. laserXtens tracks the speckle pattern in the virtual gage-mark using a sophisticated correlation algorithm between the individual camera image frames (speckle tracking).

The maximum available measurement travel derives from the difference between the camera field of vision and the initial gage-length. Depending on version and mounting, a field of vision of 16-20 mm is available for measuring purposes.

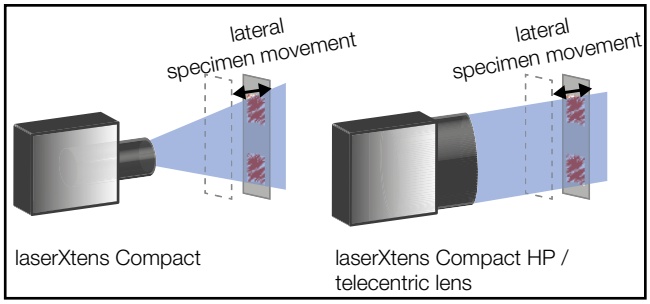


The algorithm operates in two different modes. As long as the virtual gage-mark moves within the field of vision of the camera, it will be tracked (=speckle tracking). As soon as the mark reaches the edge of the field of vision, changeover to a second measuring mode is available (= flow measurement). In this mode the flow of the material below the evaluation window is measured and the measured value determined from this. Depending on the material and/or deformation of the specimen, very good results are also obtained with this non-standard method.

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



Strain-rate-controlled tests are also possible, as shown here on a micro-specimen.



laserXtens Compact

laserXtens Compact HP / telecentric lens

laserXtens Compact HP: compensation for lateral specimen movements
With many specimens or test assemblies there is a tendency for the specimen to move out of the test axis. This happens particularly often with small specimens. However, a change in the distance of the specimen from the camera results in an enlargement/reduction of the specimen in the trapezoid field of view, influencing test results. laserXtens Compact HP's telecentric lens compensates for these lateral specimen movements, minimizing measuring errors.

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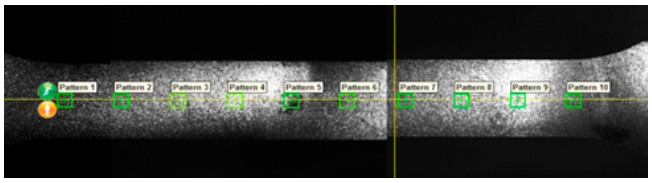
Software options

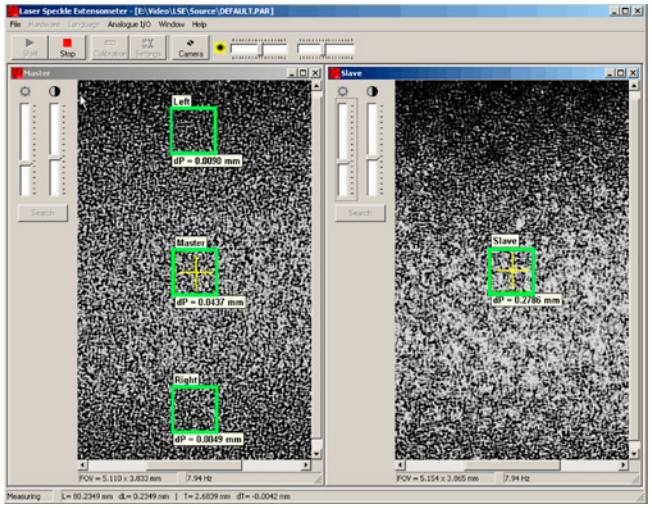
Strain distribution

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).



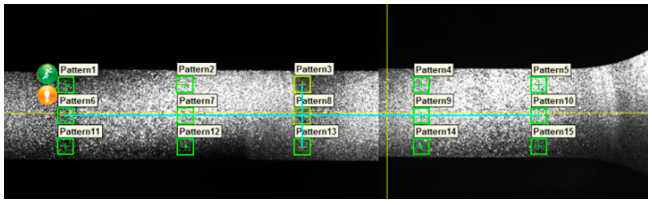
Second measurement axis

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



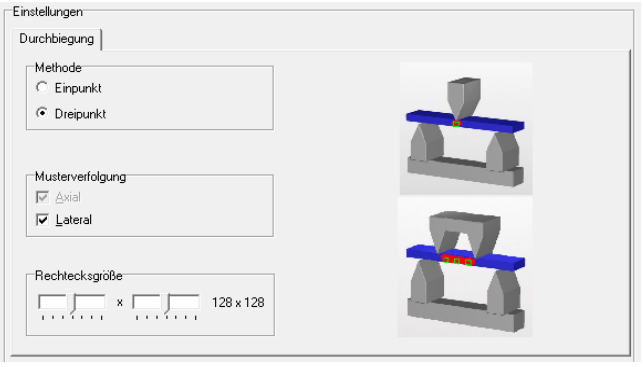
2D dot-matrix

This option enables measurement in two dimensions for measurement points on a plane specimen surface. Thereby it is possible to identify local strains and inhomogenities 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).

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	laserXtens Compact 1001574	laserXtens Compact HP 1001580
laserXtens Compact - non contacting extensometer without marks Measuring head with automatic gage length setting, 1 digital camera, including lens, red laser light source (1x for laserXtens Compact, 2x for laserXtens Compact HP), software for image acquisition, calculation of cross correlation, testXpert II Integration, toolset for calibration; Laser Class 2: no protective actions are necessary		
Testing machine	Allround-Line	zwickiLine / PrecisionLine Vario
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	3 - 13 mm by test area width 440 mm 3 - 17 mm by Test area width 640 mm	3 - 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 [1]

In combination with testXpert II and testControl or testControl II a free slot in the electronic is required.
[1] Pretests are required for specimen <1 mm

Description	Item number
Basic package for laserXtens The basic package includes a multilingual workstation, operating system Windows 7 /32 bit, testXpert II and laserXtens software, 23“ TFT-screen and a manual in German or English	**various**
Mounting 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 / zwicki-Line	**various**
Options	
Tests in temperature chambers or ovens	**on request**
Software options	
Second measurement axis for measuring axial strain and a local transverse strain simultaneously	**011069**
Strain distribution for determination of localized strains at several measuring locations	**077063**
2D dot-matrix: Measurement in two dimensions for up to 100 measurement points	**077070**
Measurement of deflection in 3- and 4-point flexure tests in test axis	**077071**
Stand-alone operation	
High performance AD/DA converter 4 inputs, 2 outputs	**021661**
High performance D/A converter, 4 outputs	**032319**