Product Information
videoXtens 1-32 HP/TZ - the high-temperature specialist for all applications

Range of application
The videoXtens 1-32 HP/TZ is a non-contact, high-resolution extensometer developed for tests which require maximum precision. This non-contact extensometer measures deformations optically in a range of environmental conditions. The measuring principle requires the application of gauge marks.

This results in a wide range of application for videoXtens 1-32 HP/TZ:
- tests at high temperatures (up to 1,400°C)
- tests in temperature chambers
- tests at ambient temperature
- long-term applications
- cyclic applications (> 2Hz loading frequency)
- tensile, compression and flexure tests

Outstanding functions
- The videoXtens 1-32 HP/TZ can be used for tests according to ISO 6892-2 (high temperature) and ISO 6892-1 (ambient temperature).
- As high-temperature materials sometimes display non-linear strain increases, pretests are required for strain-controlled tests.

High resolution and measurement accuracy
- Accuracy class 0.5 according to EN ISO 9513. Zwick extensometers exceed the requirements of the standards and are calibrated over the entire measurement range to accuracy class 0.5 according to ISO 9513.
- Accuracy class B1 according to ASTM E83 from a gauge mark distance of 15mm.

Comprehensive range of functions
- Automatic gauge mark recognition and acquisition of initial gauge length \( L_0 \).
- Exact synchronization of all measurement channels.
- Environmental influences (e.g. air swirls, variations in light) minimized by the high-temperature tunnel.
- Optimum, uniform specimen illumination by integrated LEDs.
- Strain-controlled tests are possible.
- Specimens with structured surfaces can be measured via pattern recognition with no need for additional marking.
- Entire test sequence can be followed on-screen.
- Video Capturing: recording of test, synchronized with measured curve for retrospective viewing of test.
- Wear-free system = low-maintenance.
- Calibration at ambient temperature.
- Green light plus appropriate filter minimize influence of glowing specimen.
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High precision and resolution
The videoXtens 1-32 HP/TZ features high precision and satisfies accuracy class 0.5 according to EN ISO 9513. As the system employs non-contact measurement, material characteristic values are unaffected.

Marking method for high-temperature
Only a very small number of materials can withstand temperatures up to 1000°C and still offer sufficient contrast for appropriate marking.

Aluminum oxide ($\text{Al}_2\text{O}_3$) is therefore used; this is resistant to temperatures up to 1700°C and also provides excellent contrast when used in conjunction with special lighting.

Additionally, we recommend tunneling the optical axis to prevent influences arising from thermal convection between the camera and the furnace.

Note
• With high-temperature measurements, a very strong background radiation arises through the furnace and the specimen itself. Monochrome green incident light and a green filter on the lens must be used during operation.
• The marking is sprayed on using a mask and can thus be applied to almost any desired surface.
• Care is required when handling the specimen as the marking is sensitive to the touch.

Telecentric lens
The telecentric lens means that videoXtens 1-32 HP/TZ is not affected by changes in the distance between lens and specimen. In the case of temperature chambers and high-temperature furnaces, rods are used to apply the force to the specimen. If these rods are not exactly aligned or if they employ self-aligning (spherical) mounting, there will be alignment movements at the start of the test, causing the distance from the specimen to the lens to change. With ordinary lenses these movements result in measuring errors. The telecentric lenses used with videoXtens 1-32 HP/TZ have a tolerance range of approximately ±1.5 mm.

Aluminum oxide powder
Fine $\text{Al}_2\text{O}_3$ powder suspended in solvent is applied to the specimen. This allows both round and flat specimens to be marked using the appropriate mask.

Specimen marking using aluminum oxide powder for high-temperatures (marking method: pattern)
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High-temperature version - optical tunnel
When videoXtens 1-32 HP/TZ is used in conjunction with temperature chambers and high-temperature furnaces it should be noted that the change in optical conditions for testing will have a negative effect on the measurement signal. This basically relates to air swirls inside the temperature chamber / furnace and outside on the viewing port / furnace slit. The optical tunnel minimizes these influences. The videoXtens 1-32 HP/TZ is therefore equipped with an adjustable tunnel with an optical-quality glass pane, together with an adapter plate including a rope seal which fits snugly against the temperature chamber glass pane or the slot of the high-temperature furnace.

Selected high-temperature applications

I) Creep-fatigue test
The videoXtens 1-32 HP/TZ was developed to meet the demanding requirements of creep-fatigue tests at temperatures up to 1200°C.

Special features
• Typical creep-fatigue tests at temperatures of 900°C with target strains of up to ± 1 %
• Strain-controlled cyclic tests
• Non-contact measuring system
• No influence on the specimen (notching)
• No wear (low-maintenance)

II) Creep test on micro specimens
The videoXtens 1-32 HP/TZ is used for high-temperature creep tests on micro specimens with initial gauge lengths ($L_0$) from 1.5 mm.

Special features
• Very small gauge lengths are only possible using optical measuring technology.
• Variable initial gauge lengths with videoXtens 1-32 HP/TZ

III) High-temperature tensile test on glass specimens
The videoXtens 1-32 HP/TZ is suitable for high-temperature tensile tests on sensitive and transparent specimens. For example, glass becomes soft and ductile at temperatures above around 600°C.

Special features
• Attachment of the sensor arms of contact-type extensometers deforms the glass specimen (lateral force).
• Sufficient contrast for measuring transparent specimens using marking.
• No mechanical influences on the specimen with optical measurement
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<table>
<thead>
<tr>
<th>Item No.</th>
<th>videoXtens 1-32 HP/TZ&lt;sup&gt;1&lt;/sup&gt;</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>MP01220</td>
</tr>
<tr>
<td>Accuracy class</td>
<td>0.5 according to EN ISO 9513.</td>
</tr>
<tr>
<td>Resolution</td>
<td>0.25 according to EN ISO 9513.</td>
</tr>
<tr>
<td>Initial gauge length L&lt;sub&gt;0&lt;/sub&gt;</td>
<td>1.5 to 32 mm</td>
</tr>
<tr>
<td>Measurement travel&lt;sup&gt;2&lt;/sup&gt;</td>
<td>32 mm - L&lt;sub&gt;0&lt;/sub&gt; (fixed mounting)</td>
</tr>
<tr>
<td></td>
<td>2 x (32 - L&lt;sub&gt;0&lt;/sub&gt;) (with automatic tracking)</td>
</tr>
<tr>
<td>Strain-rate control&lt;sup&gt;3&lt;/sup&gt;</td>
<td>according to ISO 6892-1 Method A1 and ISO 6892-2 Method A1</td>
</tr>
<tr>
<td>Max. following speed on the specimen</td>
<td>500 mm/min</td>
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<tr>
<td>Measurement frequency</td>
<td>70 Hz (with standard setting)</td>
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Scope of supply: measuring head with 1 digital camera including high-resolution telecentric lens, interference filter, green LED incident light lamp, high-temperature tunnel for reduction of environmental influences, software for image acquisition, accessory case with scaling aid, INC module (for tC: RS module). Includes connection to crosshead: extensometer tracks at half test speed

The videoXtens 1-32 HP/TZ operates with testXpert II (Version 3.71 and above) or testXpert III only and in combination with testControl / testControl II. The required tC RS module or INC module is already included in scope of supply. A free slot is required in testControl / testControl II.

1) Note: laserXtens 1-32 HP/TZ and 2-120 HP/TZ can be expanded with videoXtens functionality. See: PL_88_961_laserXtens 1-32 HP TZ or PL_88_786_laserXtens 2-120 HP TZ
2) Possible restriction due to furnace or temperature chamber design
3) Pre-tests required

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## Description

### Basic package for videoXtens
The basic package contains a multilingual workstation, optionally with Windows 10 64-bit, 23" TFT monitor and operating instructions in English or German. **Various**

### Mounting kit for installation at front center **Various**

### Software options
- Second measurement axis for simultaneous determination of longitudinal strain and transverse strain or change in width **013582**
- Measurement of deflection in 3 and 4-point flexure tests in test axis **077060**
- 2D dot matrix for determination of local strains and inhomogeneities on a planar specimen surface in two axes (2D). **077059**
- Test Re-Run for storing image sequences and for retrospective recalculation of strains **325932**

### Stand-alone operation
- High-resolution AD/DA converter, 4 inputs, 2 outputs **021661**
- High-resolution D/A converter, 4 outputs **032319**

### High-temperature marking kit
Comprising: airbrush, Al<sub>2</sub>O<sub>3</sub>, gauge-length stencil for use with airbrush and gauge-length clamps **MP01221**

All data at ambient temperature. We reserve the right to make technical changes in the course of ongoing development.