» Precise Non-Contact Measurement
No mechanical influence of the specimen due to the non-contacting camera system.

» High Resolution and Accuracy
Different lenses are available for different FOV, resolution and accuracy. System calibration provides measures in mm.

» Longitudinal Measurement
Measurement of longitudinal strain.

» Templates For Easy Test Setup
For quick and easy measurement, a series of templates are available for different test setups and applications.

» Benefits over Traditional Contact Extensometers
- No influence of the weight or operating-force on the test specimen
- No problems with knife-edge slip or damage to the specimen
- No errors due to inertia of moving parts
- No moving parts eliminate errors due to wear
- No possibility of damage due to energy release at failure
- Non-Ambient testing conditions

The VE1 video extensometer is a high precision instrument that uses a non-contacting optical measurement system based on a digital camera and real-time image processing to measure the longitudinal and transversal strain during a tensile test. The system measures longitudinal strain between two applied lines at a rate of up to 100 Hz. The strain data is synchronized and transferred to NEXYGENPlus 3 software (Series Plus & LS machine). An optional analog signal can be used for older machines.

Applications
The VE1 is ideal for determining material properties in tensile tests. Sample deformation is measured without contact with the specimen to determine measurements such as stress-strain curves, e-modulus, investigation of strain behaviour on high speed tests and true strain controlled tensile tests.

The VE1 has a large application area and can test a wide range of materials including metals, rigid plastics, composites, ceramics, thick films etc. in both ambient and non-ambient temperature conditions.
Wide Range of Measurements
• Longitudinal strain from 2 line markers
• Distance (mm) of the line markers

Wide Range of Strain Measurements
The VE1 video extensometer has a wide range of strain measurements. Strains from 20 μm/m up to more than 1000% can be measured. System calibration provides measurements from a few mm to multiple m. The VE1 is saving images during the tensile test and can be used until sample break.

Simple Preparation
The VE1 measures strain by tracking contrasting gauge marks placed on the specimen. The marks can be made with a black or white pen, adhesive or paint. For quick and easy measurement, a series of templates are available for different test setups and applications.

Non-contact Measurement
A high performance digital camera with an IEEE 1394 (Firewire) digital interface provides high resolution measurements. The VE1 video extensometer provide real time calculation of strain from the camera.

Gauge Length and Field of View
To define the field of view, you have to know:
• The initial length of your specimen (L0)
• The maximum elongation in % or in mm

This table will give you the maximum field that must be covered and analyze the camera.

<table>
<thead>
<tr>
<th>Working Distance mm</th>
<th>500 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gauge Length (L0)</td>
<td>Max Elongation</td>
</tr>
<tr>
<td>10 mm</td>
<td>100%</td>
</tr>
<tr>
<td>20 mm</td>
<td>30%</td>
</tr>
<tr>
<td>20 mm</td>
<td>100%</td>
</tr>
<tr>
<td>20 mm</td>
<td>400%</td>
</tr>
<tr>
<td>20 mm</td>
<td>800%</td>
</tr>
<tr>
<td>25 mm</td>
<td>100%</td>
</tr>
<tr>
<td>25 mm</td>
<td>600%</td>
</tr>
<tr>
<td>50 mm</td>
<td>25%</td>
</tr>
<tr>
<td>50 mm</td>
<td>100%</td>
</tr>
<tr>
<td>50 mm</td>
<td>300%</td>
</tr>
<tr>
<td>80 mm</td>
<td>30%</td>
</tr>
<tr>
<td>80 mm</td>
<td>100%</td>
</tr>
<tr>
<td>100 mm</td>
<td>10%</td>
</tr>
<tr>
<td>100 mm</td>
<td>100%</td>
</tr>
</tbody>
</table>

* Generally, FOV requires 2 x (L0+Max elongation)

Optional Lens
Available standard lenses with focal length (mm):
• 8, 12, 16, 28, 50, 75
• Zoom: 24-85
• Larger focal length on request
Accessory Kits
The VE1 is composed and supplied with:
• CCD Camara 2 Mp
• One lens
• Black and white specimen marker pens
• Calibration plate
• Gauge mark template
• 300 mm LED vertical light
• Stand

The camera can be used with different lenses to have up to six Field of View (FOV).

Integration with Tensile Testing Machines
The VE1 video extensometer can be used with any current Lloyd Instruments test machine. Full control of the VE1 and analysis is possible with Lloyd Instruments accredited NEXYGENPlus 3 materials testing software.

Easy Operation with Intuitive User Interface
The VE1 video extensometer features a modern, configurable and intuitive user interface using OpenGL technology for easy operation.

Low Processor Load
The multi-thread analysis kernel supports multi-core processors to achieve a low processor load.

PC Requirements
The VE1 runs on the same PC as the testing machine software. The minimum specification for the PC is:
• i3 (faster than 2.8GHz, with FireWire-interface)
• Windows XP or 7 operating system
• Available PCI slot
• An actual graphics card
• Installed driver that supports at least OpenGL 2.0

Options for mounting on to various frames and temperature chambers are available.

A Multitude of Configurations
The table below shows the standard configurations of the VE1. Other configurations are available on request.

Technical Specification

<table>
<thead>
<tr>
<th>Configuration Reference</th>
<th>VE-50-500</th>
<th>VE-28-500</th>
<th>VE-16-500</th>
<th>VE-8-500</th>
<th>VE-Z-500</th>
<th>VE-8-1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working Distance mm</td>
<td>500</td>
<td>500</td>
<td>500</td>
<td>500</td>
<td>500</td>
<td>500</td>
</tr>
<tr>
<td>Focal Length mm</td>
<td>50</td>
<td>28</td>
<td>16</td>
<td>8</td>
<td>ZOOM 24-85</td>
<td>8</td>
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<tr>
<td>FOV mm</td>
<td>60</td>
<td>120</td>
<td>210</td>
<td>440</td>
<td>35-140</td>
<td>890</td>
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<tr>
<td>Minimal Resolution μm</td>
<td>0,3</td>
<td>0,6</td>
<td>1,05</td>
<td>2,2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lines thickness mm</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>1 à 3</td>
<td>5</td>
</tr>
<tr>
<td>Dots Ø mm</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>2 à 4</td>
<td>4</td>
</tr>
<tr>
<td>Data Rate*</td>
<td>± 2 μm or ± 0,5% of the reading</td>
<td>± 4 μm or ± 0,5% of the reading</td>
<td>± 6 μm or ± 0,5% of the reading</td>
<td>± 16 μm or ± 1% of the reading</td>
<td>± 2 μm or ± 0,5% of the reading</td>
<td>± 4 μm or ± 0,5% of the reading</td>
</tr>
<tr>
<td>Accuracy</td>
<td>De 100 Hz à 10 Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* The data sampling frequency may be less than values indicated in the specifications, due to the PC performance and load.
**Ordering Information**

<table>
<thead>
<tr>
<th>Order number</th>
<th>Description</th>
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<tbody>
<tr>
<td>01/3892</td>
<td>VE1 Non-contacting video extensometer</td>
</tr>
</tbody>
</table>

**Optional Accessories**

- 01/3894: Zoom or fixed focus lens
- 01/3895: Tripod
- 01/3896: 3D-gated head
- 01/3897: 300 mm LED line light
- 01/4474: 600 mm LED line light
- 01/4468: Video Extensometer Stand. Common parts. All machines.
- 01/4469: Video Extensometer Stand 600 mm Beam
- 01/4470: Video Extensometer Stand LS Machine Adaptor
- 01/3899: Robust system case for camera and accessories
- 01/4473: NI DAQ Interface for Video Extensometer (BNC Output) includes 6.35 mm male jack plug cable.

**Working Distance**

<table>
<thead>
<tr>
<th>Working Distance mm</th>
<th>Lens Sizes 8 mm</th>
<th>Lens Sizes 16 mm</th>
<th>Lens Sizes 28 mm</th>
<th>Lens Sizes 50 mm</th>
<th>Lens Sizes 75 mm</th>
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<tbody>
<tr>
<td>100</td>
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<td>38</td>
<td>18</td>
<td>7</td>
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<td>800</td>
<td>709</td>
<td>351</td>
<td>197</td>
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<td>900</td>
<td>798</td>
<td>396</td>
<td>223</td>
<td>122</td>
<td>79</td>
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<tr>
<td>1000</td>
<td>888</td>
<td>440</td>
<td>249</td>
<td>136</td>
<td>88</td>
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</table>

**AMETEK Test & Calibration Instruments**

A business unit of AMETEK Measurement & Calibration Technologies offering the following industry-leading brands for test and calibration instrumentation.

**LLOYD Materials Testing**

Materials Testing Solutions

Materials testing machines and software from Lloyd Instruments guarantee the highest level of performance and capability for production testing, quality control, laboratory testing, research and education to provide expert materials testing solutions.

**Davenport Polymer Test Equipment**

Allows critical polymer parameters to be determined, including melt flow index and melt flow rate, intrinsic viscosity (IV) measurement of moisture-sensitive PET polymers and polymer density measurement.

**Texture Analysers**

The comprehensive program provides the platform to perform rapid, general food testing and detailed texture analysis on a diverse range of foods.

**Chatillon Force Measurement**

Chatillon has been a hallmark in the industry since 1835. The hand held gauges and motorized testers have earned their reputation for quality, reliability and accuracy and they represent the de facto standard for force measurement.

**Newage Testing Instruments**

Newage offers a comprehensive range of hardness testers, durometers, optical systems and software for measurement, data acquisition and analysis.

**JOFRAP Calibration**

The inventor of the portable high precision dry-block temperature calibrators. The calibration instruments program also covers precision thermometers and temperature baths, temperature sensors handheld instruments for pressure calibration and process signal calibrators for easy control loop calibration, measurements and simulation.

**M&G Pressure Testers & Pumps**

Pneumatic floating-ball or hydraulic piston dead weight testers with accuracies to 0.015% of reading.

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