… from development to implementation

Labor Tech®

Production of materials testing equipment and automation

Optical Extensometer - ONE

Made in Czech Republic

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Optical Extensometer - One
HARDWARE

… from development to realization

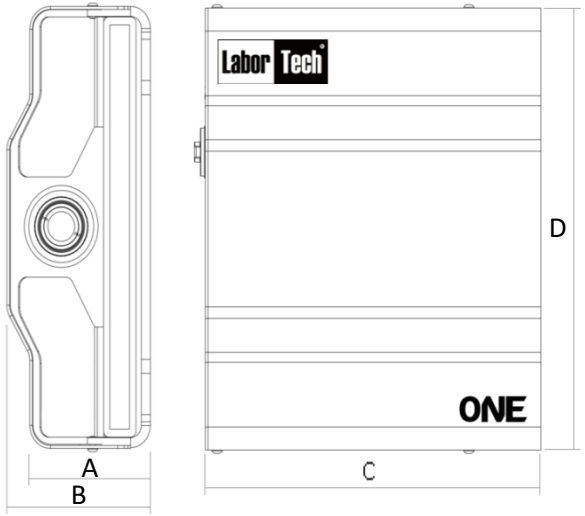
Product Description

New advanced Axial, Transverse or Bi-Axial video extensometer using the latest Digital Image Correlation (DIC) technology. A fully integrated, easy to use and versatile solution for strain measurement within Quality Control and Research environments. Meets the latest international testing standards measuring modulas and strain to failure on many materials.

Material Testing:

- Tensile Test – axial/transversal
- Compression Test
- Bending Test – 3 or 4 point
- Shear Test
- Torsion Test
- Fatigue Test – axial/torsional

Mechanical Description



A	B	C	D	Weight
67mm	80mm	186mm	220mm	1.4kg

LED Light

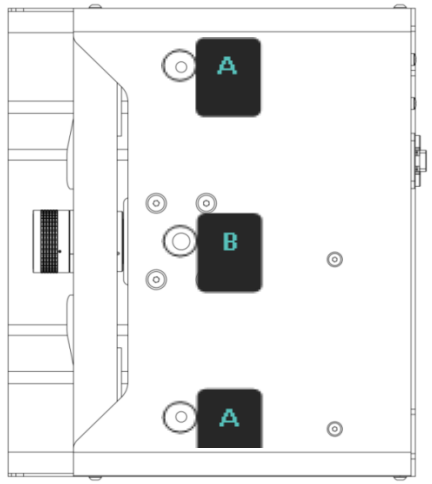
Parameters:

- Max. power consumption: 7.7W (4.8W RED)
- Light Wavelength: 425nm (625 RED)
- Operating Temp: 10 to 30°C
- Operating Humidity: 30% to 70%

Mounting Options

Parameters:

- Max. power consumption: 7.7W (4.8W RED)
- Light Wavelength: 425nm (625 RED)
- Operating Temp: 10 to 30°C
- Operating Humidity: 30% to 70%



Two mounting options are ready to be used on ONE's body.

A – 2xM6
Meant to be used to fix ONE to arm (extr. alm. profile or so).
B – 3/8" UNC
Meant to be used to fix ONE to tripod head.

Power Supply

Parameters:

- Input Voltage: 110-240VAC
- Output Voltage: 24VDC
- Output Power: 24W
- Operating Temp: -10 to 40°C
- Operating Humidity: 5% to 90%

Connect the power Ethernet cable to PoE socket to power ONE. Connecting the cable to LAN socket will cause no harm

Cable Connections

All cabling on ONE is on the rear panel and consists of three connectors.
FROM TOP

- **RELAY** – USB2 type B connector to operate the relay for light control
- **CAM** – USB3 type B connector for camera connection and image data transfer
- - **24V** – RJ45 connector for DC 24V input. Standard PoE pinout is used. (DC+ on pins 4 and 5; DC- on 7 and 8). A NEUTRIK NE8MC-1 connector can be used to lock the connection

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Optical Extensometer - One **SOFTWARE**

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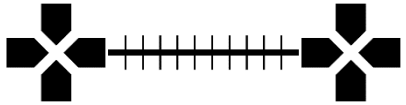
Software Alpha®

- A very new DIC based video extensometer brings reliability and simplicity to the area of optical measurement of material mechanical properties. Advanced algorithms allows the system to get the best of today's digital cameras as the resolution of the system can get to 0.003px.
- The system is bounded with graphic user interface that is straight forward, wizard based and therefor easy to understand.
- Output of the measured values can be provided as both digital and analogue signal. This gives the user enough options to connect the system to the testing machine control unit and control the Alpha software remotely.

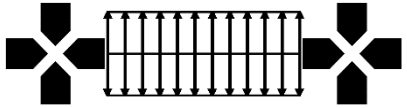
1. A - Axial Strain Module

Axial Strain software module allows to measure axial strain in real time. Besides the elementary measurement probes such as point or line the Alpha axial strain module includes an Extreme Line probe that divides the free length of the specimen into specified number of measured lengths (L_0) and detects the area of necking. The Extreme Line has enhanced resolution during the Young's modulus and minimizes the number of invalid tests at the same time

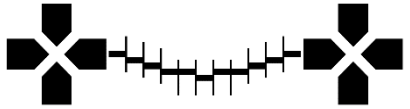


2. T – Transversal Strain Module

- Transversal Strain software module allows to measure transversal strain in real time. Besides the elementary measurement probes such as point or line the Alpha transversal strain module includes a Trans Line with edge detection feature that divides the free length (or gauge length) of the specimen into specified number of cross sections and detects the area of necking. This brings an advantage over mechanical transversal devices as the measurement is taken in multiple positions along the specimen and only the highest negative strain is sent to the output.



- Apart of Trans Line the transversal module comprises a Bend Line, a measurement probe designed for 3 and 4 point bending testing. This probe has measurement point along the main line to track the specimen during the deformation.



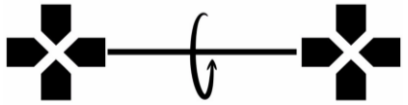
- Transversal module does not limit the user in number of measure

3. AT – Axial & Transversal Strain Module

A bundle of axial and transversal software module providing the wide pallet of measuring probes: Point, Line, Extreme Line, Trans Line and Bend Line.

4. TR – Torsional Module

Torsional software module allows to measure twist angle in real time on cylindrical samples in static or fatigue mode.

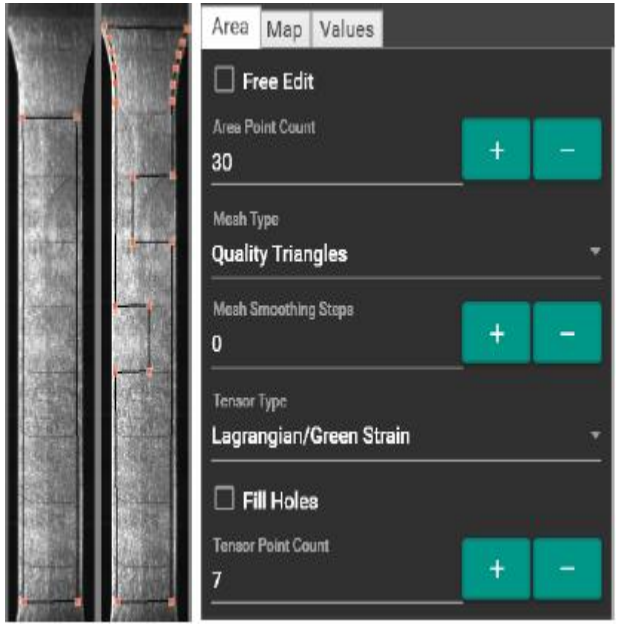


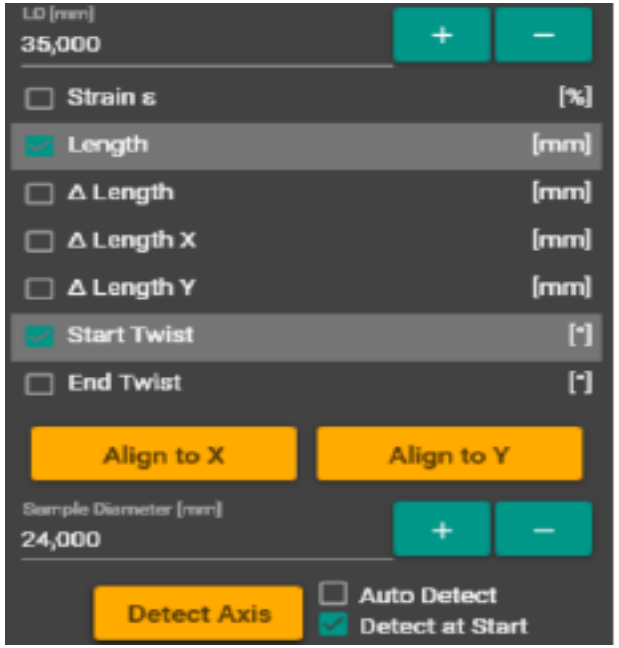
5. MC – Multi Camera

Sometimes one camera is not enough to capture the whole event with sufficient or desired resolution. The answer is use of multiple camera setup. This opens the possibility to keep high resolution while keeping the cost of the system low in comparison with high-resolution cameras based setup.

6. FM – Full field Module

Interpolizes the value for the lost point. It only works for one lost point. It is possible to set multiple mutually independent areas with different map value settings and range of color scale. the choice of the strain tensor type and the triangulation type for each computed area separately; export to ParaView.





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Optical Extensometer - One **TECHNICAL PARAMETERS**

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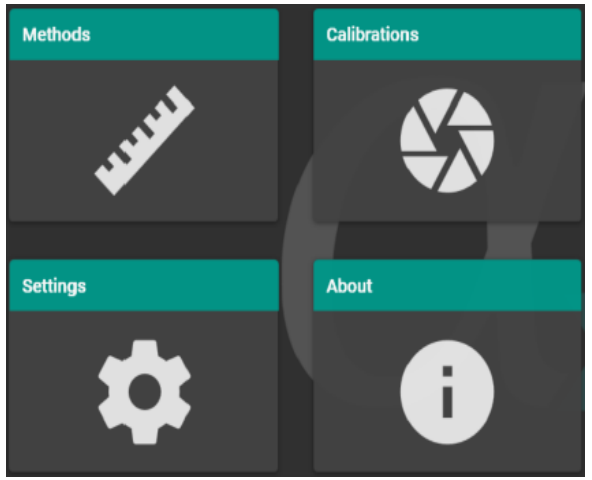
Default Features

- Default single cam measurement length: 110mm (220mm)
- Default resolution according to ISO9513: Class 0.5 (Class 1)
- Default resolution according to ASTME83-10: Class B-1 (Class B-2)
- Gauge Length: Selectable single or multiple points L0
- Data acquisition rate: 75-500Hz
- Transverse Measurement: Optional transverse or Bi-axial
- Axial and radial neck detection
- Output: Digital and analog*
- Lighting: Auto-switching monochromatic light
- Software Integrated: via extensometer user interface**
- Mounting: Test frame, chamber or Tri-pod

Software

- **User comfort:** Easy graphical interface based on "guides"
- **Operator mode:** Easy admin logout
- **Calibration:** For a single calibration it is possible to connect an unlimited number of methods
- **Periodical calibration:** Easy to enter a correction factor
- **Light remote control:** Possibility to connect multiple USB relays
- **Types of measurable deformtions:** Tension, pressure, shear, bending, torsion
- **CPU requirements:** The ability to choose the number of CPU cores used



Main hardware advantages

- **Components: Only one Box**
- **Optical access: Direct**
- **Light:** Blue monochrome with wavelength corresponding to the highest sensitivity of the camera chip; supports the possibility of using a narrow band filter for ambient light filtering
- **Power consumption:** Approx. 10W
- **Camera:** 5MPx
- **Tripod or shoulder attachment options:** Using M6 or tripod 3/8 "UNC for direct mounting on a tripod
- **Declaration of Conformity:** The product has a valid declaration of conformity

Technical specification M5			Resolution class according to ISO 9513		
			class 0,5 - 0,5um or 0,5% of reading	class 1 - 1um or 1% of reading	class 2 - 2um or 2% of reading
Effects measurement length [mm]	No. of cameras	1	120	240	480
		2	2x120*	460	920
		3	3x120*	680	1360
Software Feature Pack			A – Axial elongation**		
			T – Transversal elongation**		
			AT – Axial and transversal strain		
Effects working distance[mm]	Focus distance	12mm	120	300	655
		16mm	180	420	895
		25mm	315	690	1435
		35mm	462	985	2030
		50mm	685	1435	2925
Technical specification M9			Resolution class according to ISO 9513		
			class 0,5 - 0,5um or 0,5% of reading	class 1 - 1um or 1% of reading	class 2 - 2um or 2% of reading
Effects measurement length [mm]	No. of cameras	1	220	440	880
		2	420	840	1680
		3	620	1240	2480
Software Feature Pack			A – Axial elongation**		
			T – Transversal elongation**		
			AT – Axial and transversal strain		
Effects working distance[mm]	Focus distance	12mm	140	335	730
		16mm	200	465	990
		25mm	350	760	1580
		35mm	515	1085	2230
		50mm	760	1575	3210

* Due to the external dimensions of the camera unit, small field of view cannot be connected. For measuring length 220mm with accuracy class 0,5 use system M9

** Software feature pack A or T included as a standard

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