EAE000EN03

Tinius Olsen

AUTOMATIC
Variable Gage Length Extensometers

Tinius Olsen

The first name in materials testing

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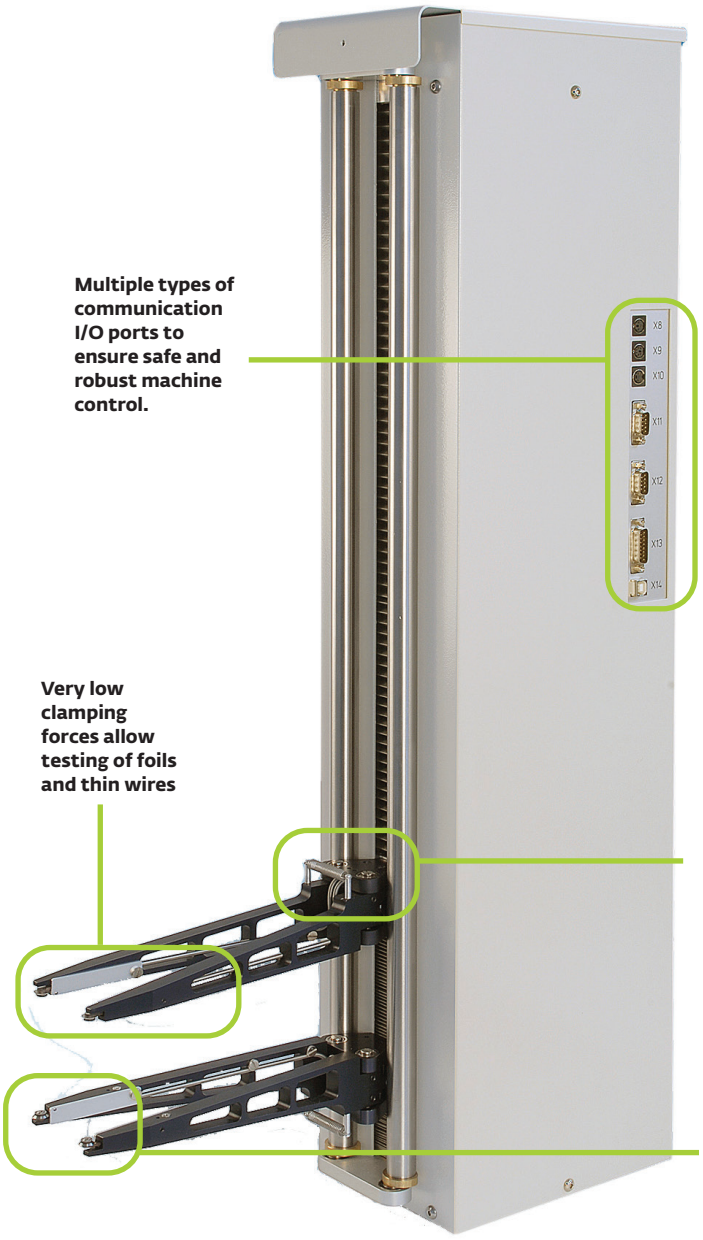
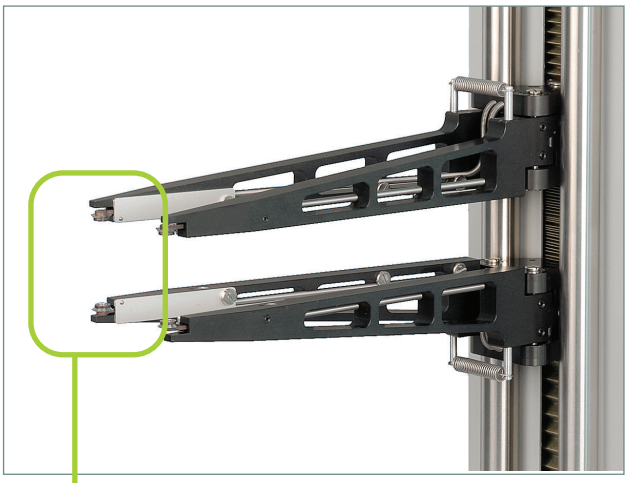
Horsham, PA, USA • Redhill, Surrey, UK • Noida, UP, India • Shanghai, PR China

Extensometer System





AREA OF APPLICATION

The extensometer models AE300 and AE500 are suitable for almost all samples with an initial gauge length from 10 mm. Their low clamping forces combined with high measurement accuracy makes them highly suitable even for small, notch sensitive test samples. The AE series can be connected to partly or fully automatic testing machines and used with all types of grips. The strain can be measured from the elastic range to fracture for almost all types of samples. When used in combination with the transverse models (as shown in the figure below), the AE extensometers are highly suitable for testing the deep-drawing properties of thin sheets.

DESIGN AND FUNCTION

Each one of the four measuring arms of the AE models have a measuring spring bonded with a full bridge strain gauge. The measuring springs of a right and left arm pair are connected in parallel to obtain an average value which is important if the sample deforms non-homogeneously. DC motors compensate the changes in the measuring spring signal initiated through the sample elongation by a ball-bearing gear ensuring that the measuring heads move according to the sample elongation and make the measuring heads follow the sample extension. The elongation is recorded by an opto-incremental measuring system. The measuring heads mounted on the measuring arms show an exact parallel movement which is achieved through a zero-backlash linear guidance system. Using this principle avoids errors which occur when using measuring sensors with fixed points of rotation through angle changes and also errors due to tilting of the knife edges on the sample. The measuring heads and arms can be separated from the linear guidance system and can be changed easily and quickly.

CONTROL

The AE extensometers are controlled through our Horizon software via a serial interface (RS 232 or USB). All movements can be initiated at any time required. The measuring arms can be positioned parallelly within the available interval under computer control and thus can quickly be adjusted symmetrically to different sample lengths. The gauge length (Lo) can be set from 10 mm to the maximum possible measuring stroke. The travel is simply calculated from the maximum measurement range of either 300mm, 500mm or 800mm less the gauge length.

The AE models have an additional positioning range of 190 mm for the symmetrical adjustment of the initial gage length. With the arms open the required measurement position can be approached. Before the approach of the measuring position the digital measurement system is calibrated by reference marks. The opening and closing of the arms can be initiated at any time required.

Specification

TECHNICAL DATA	AE 300	AE 500	AE 800
Accuracy class EN ISO 9513	0.5	0.5	0.5
Accuracy class ASTM E83	B1	B1	B1
Measurement principle	Opto - incremental		
Travel (minus gage length)	300 mm	500 mm	800mm
Position travel	190 mm	190 mm	190 mm
Gauge length	10 to 300 mm	10 to 500 mm	10 to 800 mm
Error in linearity	0.005	0.005	0.005
% Error in gauge length	0.5 %	0.5 %	0.5 %
Resolution	1 or 0.1 µm	1 or 0.1 µm	1 or 0.1 µm
Activating force	<0.01 N	<0.01 N	<0.01 N
Clamping force **	0.25 N	0.25 N	0.25 N
Operating temperature range	0 - 50 °C	0 - 50 °C	0 - 50 °C
Weight	Approx. 26 kg	Approx. 31 kg	Approx. 38 kg

* The larger of the values is admissible

** The clamping force can be adjusted by tension springs

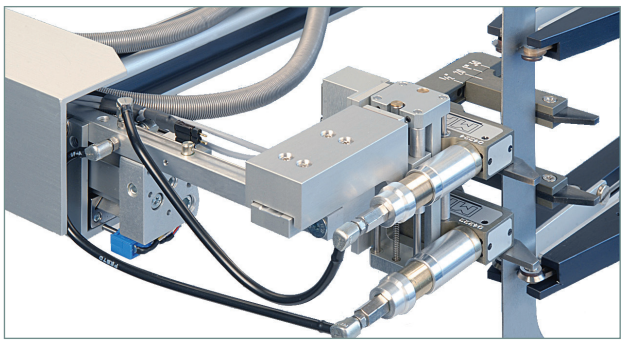
SAMPLE DIMENSIONS

Maximum sample thickness	30 mm
Maximum sample width	50 mm
Maximum sample diameter	80 mm

Compatible with Tinius Olsen electromechanical and hydraulic tension and compression testing machines

Key features

- Two-sided measurement by means of 4 measuring sensors.
- Very high resolution of up to 0.1 µm over the complete measuring range.
- Very low clamping forces even allow testing of foils and thin wires
- The round knife edges can be utilized along their entire perimeter by rotating them.
- The gauge length position and value can be exactly set under computer control.



Close-up of follower arms on AE300 and transverse AE extensometers on specimen.

OPTIONS

1. Measurement in compression or deflection.
The AE models work in tension or compression, however, an optional module can be added that will allow the models to work in both directions.

2. Different lengths of measuring arms, and higher travel available.
Measuring arms of either an additional 75mm or 200mm length (additional to the standard length of 254mm) can be used ro follow the specimen movement, allowing the extensometer to be used at a greater distance from the specimen.

3. The installation of a fan / ventilator for use in dusty / dirty environments.
Any dirt or dust can play havoc with electronics and fine measuring systems, so putting the extensometer under a positive pressure prevents the ingress of dust and dirt.

Software

Tinius Olsen has built upon its long history of providing solutions to an enormous variety of testing problems to develop Horizon, a comprehensive software program that makes testing simple, precise and efficient.

Whether the test sample is metal, paper, composite, polymer, rubber, textile or a micro-component, Tinius Olsen's Horizon software goes far beyond data collection and presentation. It will help automate operations, from R&D to the charting and analysis of QC testing.

Our Horizon software sets new standards of data analysis by adding a host of report writing and data manipulation capabilities that will make easy work of your materials testing programs. As with most features of Horizon, flexibility is key; reports can be customized by operators in any way they wish, as can all user screens, allowing operators to focus on features that are most important to them.

In addition to powerful reports, Horizon Materials Testing software is networkable and scalable so that operators and managers can operate equipment and review test results from multiple sources and locations. Horizon provides a library of standard, specific, and application-focused test routines that have been developed in close co-operation with customers around the world and to the standards they are using.

Key Features

- **Built-in set-up and calibration of AE extensometers**
- **Built-in signal conditioning and data collection**
- **Operation of follower arms on unique test button on test screen.**
- **Seamless integration into Horizon software.**

Among the many valuable features offered by Horizon are: a test routine library; simultaneous multiple machine control; test, output, method and result editors; and multilayered security. This software is designed for data acquisition, data analysis, and closed loop control of nearly all Tinius Olsen testing machines.

Horizon is rich with capabilities that improve productivity and enable you to build, access and use a modern, powerful materials testing database. It employs the latest Windows environments, running on touchscreen-enabled monitors, to create an intuitive user experience.

Built-in tutorials, online help, and help desk access provide additional user support.

"Horizon makes testing simple, precise and efficient"