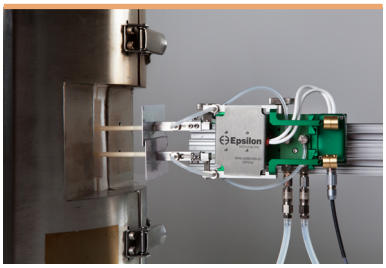
Suitable for tensile and fatigue testing when using split type materials testing furnaces or induction heaters. This model can be mounted on a hot test sample in a few seconds. With low sensitivity to vibrations, this innovative high-temperature extensometer is ideal for the demanding requirements of strain-controlled, elevated temperature uniaxial tension and fatigue testing.



Model 3549 with a 25 mm gauge length shown with a split furnace

Model 3549 with 25 mm gauge length

Model 3549 top view showing contact force scale for repeatable placement against test specimens

See the Model 3549 extensometer videos

The Model 3549 is a major advancement in the design of externally mounted furnace extensometers. It is designed to meet the stringent requirements of strain-controlled testing as prescribed in ISO 6892, ISO 12106, ASTM E21, and ASTM E606, while introducing many innovative features that improve productivity and performance for static tensile testing, long-term testing such as low cycle fatigue and creep, and other applications requiring small strain measurements.

The overall design reduces influence from common lab environment vibrations, thermal noise, and thermal drift. It also allows the user to precisely set the contact force against the test specimen. This allows for even and repeatable contact force, limiting contact force induced errors.

The gauge length for the 3549 is automatically set prior to mounting on the test specimen, which allows for hot mounting after thermal equilibrium has been reached. These extensometers can be used in carousel systems for rapid high temperature testing.

This extensometer mounts on a slide bracket (included) that attaches to a load frame mounting bracket or directly to a furnace that has a suitable cutout. Epsilon can supply mounting brackets for nearly any load frame.

The Model 3549 is made for use with split type materials testing furnaces and induction heaters, and it uses liquid cooling in most applications. The -ST version is rated to 1200 °C (2200 °F) and is supplied with high purity alumina rods. The high temperature -HT option allows use to 1600 °C (2900 °F) and is supplied with alpha grade silicon carbide rods. Rods are made to order to the length required for your furnace.

Model 3549 extensometers are strain gaged devices, making them compatible with any electronics designed for strain gaged transducers. Most often they are connected to a test machine controller with electronics for a strain channel, and Epsilon will equip the extensometer with a compatible connector that is wired to plug directly into the controller. For systems lacking the required electronics, Epsilon can provide a variety of signal conditioning solutions that enable connecting to data acquisition systems or other equipment.

Features

- **May be left on through specimen failure.**
- Hot mountable and retractable.
- Designed to meet the demanding requirements of strain-controlled testing, such as required by ISO 6892, ISO 12106, ASTM E21, and ASTM E606, as well as more common testing. The 3549 is designed to isolate the strain sensing components from external vibrations and unwanted thermal effects.
- For applications requiring fatigue testing frequencies >2 Hz and to obtain the highest dynamic performance available, see Model 7650A (page 34).
- All models can measure in both tension and compression and can be used for cyclic testing.
- Innovative slide mount allows the extensometer to engage the specimen once the test temperature has been achieved.
- The gauge length is set automatically between each test with Epsilon's unique auto-setting mechanism, which allows the device to be mounted to a hot sample in seconds.
- The low contact force is easily controlled through the included contact force setting assembly. This allows for easy, repeatable placement of the extensometer on subsequent specimens with the same amount of force.
- The gauge length of the 3549 can be easily adjusted to virtually any gauge length through the use of gauge length spacers.
- The 3549 is designed to be used with single furnaces and carousel systems.
- Rugged, dual flexure design for strength and improved performance.
- Mechanical overtravel stops in both directions.
- All units come with either high purity alumina ceramic rods (1200 °C) or alpha grade silicon carbide rods (1600 °C).
- The 3549 includes quick attach connectors for the liquid cooling lines and the electrical connections, which allow for easy installation of the extensometer body.
- Includes the Epsilon Shunt Calibration System for on-site electrical calibration.
- Full bridge, 350 ohm strain gaged design for compatibility with nearly any test system.
- Includes high quality foam lined case and a spare set of ceramic rods.

Specifications

Accuracy:	Standard configurations meet ASTM E83 class B-1 and ISO 9513 class 0,5 requirements for accuracy. A test certificate is included. Rod lengths >250 mm (10") can affect the final class rating.
Temperature Range:	Standard (-ST) is to 1200 °C (2200 °F), optional (-HT) 1600 °C (2900 °F)
Coolant Interface:	Two barbed hose fittings for 1/8" (3.2 mm) ID coolant hoses
Contact Force:	Adjustable up to 400 grams
Operating Force:	<30 grams typical
Cable:	Integral, ultra-flexible cable, 2.5 m (8 ft) standard
Excitation:	5 to 10 VDC recommended, 12 VDC or VAC max.
Output:	1.5 to 2 mV/V nominal, depending on model

Options

Model EPS170 constant-temperature recirculating chiller - *see the Options tab on the web page for important details about liquid cooling requirements*
High temperature option (-HT suffix) for use to 1600 °C
3590-VAC vacuum-rated cooling components for testing in high vacuum environments
Load frame mounting brackets
Connectors to interface to nearly any brand of test equipment
Rod tips can be straight chisels or conical tips; specify when ordering

Ordering Information

Model 3549 Available Versions: ANY combination of gauge length, measuring range and temperature range listed below is available, except as noted. *Other configurations may be available with special order; please contact Epsilon to discuss your requirements.*

Gauge Length

METRIC	
-010M	10.0 mm
-0125M	12.5 mm
-020M	20.0 mm
-025M	25.0 mm
-030M	30.0 mm
-040M	40.0 mm
-050M	50.0 mm
U.S.A.	
-0050	0.500"
-0100	1.000"
-0200	2.000"

Measuring Range

DESIGNATION	% STRAIN
-010[1]	±10%
-020	+20%/-10%
-050	+50%/-10%
-100[2]	+100%/-5%

Model Number 3549- __ __ __ __ - __ __ __ - __ __

Temperature Range

-ST	Ambient to 1200 ˚C (Ambient to 2200 ˚F)
-HT	Ambient to 1600 ˚C (Ambient to 2900 ˚F)

[1] *Not available in 10 mm, 12.5 mm, or 0.5 inch gauge lengths.*

[2] *Not available in 50 mm or 2 inch gauge lengths.*

Example: 3549-025M-050-HT: 25 mm gauge length, +50%/-10% measuring range, high temperature option (room temperature to 1600 °C)

Visit our website at www.epsilontech.com
Contact us for your special testing requirements.

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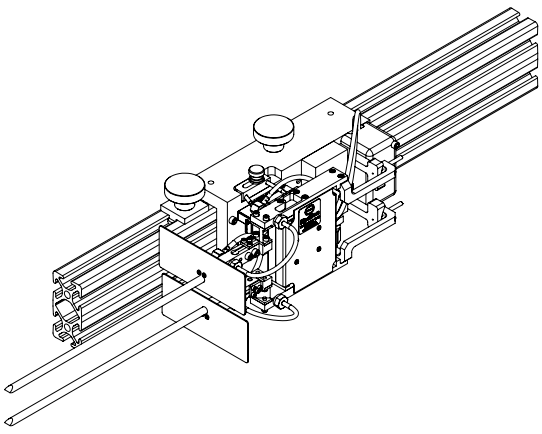

MODEL 3549 EXAMPLE