

**Simultaneously measures in-plane bi-axial strains at high temperatures on specimens tested in X-Y bi-axial machines. For use with materials testing furnaces or induction heating up to 1600 °C (2900 °F). May be used for bi-axial strain controlled fatigue. Slide mounting system enables mounting to hot specimens in seconds.**



*Model 7651 planar biaxial extensometer with tension-tension specimen*

Model 7651 extensometers measure combined in-plane strains in flat cruciform specimens tested in machines capable of simultaneous X and Y (perpendicular) axial loading and on standard flat samples tested in pure tension. All models are capable of bi-directional displacement in both axes

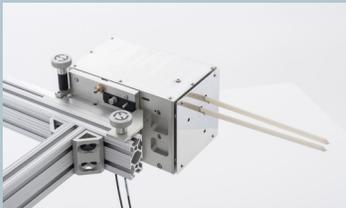
and may be used for strain-controlled fatigue testing under fully reversed load and strain conditions at frequencies up to 10 Hz.

All 7651 models mount rigidly on the load frame and incorporate slide mounting to bring the extensometer into contact with the specimen. The gauge length is set automatically before mounting on the test specimen, which allows for hot mounting after thermal equilibrium has been reached.

These units are specifically designed to eliminate crosstalk between axes and to provide high accuracy, high resolution measurements. They incorporate capacitive sensors for low operating force and include electronics with programmable filtering and multi-point linearization for improved performance and accuracy. The overall design minimizes, and in many cases virtually eliminates, any influence from common lab environment vibrations.

These liquid-cooled extensometers are equipped with high purity alumina rods with conical rod tips for specimen contact when testing to 1200 °C (2200 °F). Silicon carbide rods are used for the 1600 °C (2900 °F) high temperature option.

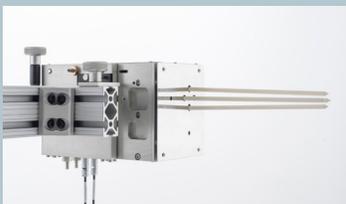
The Model 7651 is often customized for specific test needs. *Contact Epsilon for a configuration that matches your requirement.*



*Model 7651 extensometer with 12.5 mm X and Y gauge lengths*



*Model 7651 extensometer with two-channel Model DT6229 signal conditioner*



*Model 7651 extensometer ceramic arms with conical tips*

## Features

- Hot mountable and retractable.
- Self-setting gauge length with fine adjustment feature.
- All models can measure in both tension and compression and may be used for cyclic testing at test frequencies up to 10 Hz.
- Ships fully calibrated with calibration that is traceable to NPL; voltage output may be user-specified (typically 0-10V).
- Excellent ambient vibration rejection; primary vibration mode >100 Hz typical
- Digital controller and power supply included. Provides high level DC voltage output with low noise. Easily interfaced to test controllers, data acquisition boards and chart recorders.
- Includes high speed analog and digital outputs.
- Web-based user interface for setup and data acquisition.
- Selectable analog and digital filter options from 2 Hz to 3 kHz.
- Built-in calibration reference and auto-zero features.
- Multiple extensometer calibration files may be loaded for use with one controller.
- Can be used with specimens at elevated temperatures while only requiring room temperature calibration.
- Quick-disconnect water cooling fittings and signal cables.
- Includes high quality foam lined case and a spare set of rods.

## SPECIFICATIONS

- Analog Output:** User specified,  $\pm 10$ VDC typical,  $\pm 10.8$  VDC rail
- Digital Output:** 24 bit high speed Ethernet output with built-in web interface
- Cyclic Testing:** Up to 10 Hz, depending on test system and test amplitude
- Accuracy:** Standard configurations meet ASTM E83 class B-1 and ISO 9513 class 0,5 requirements for accuracy. A test certificate is included.
- Linearity:** 11 point digital linearization,  $\leq 0.1\%$  FS typical linearity
- Hysteresis:**  $\leq 0.1\%$  FS typical
- Crosstalk:** none
- Resolution:** <75 PPM (0.0075%FS) RMS @ 4 kHz, <6PPM (0.0006%FS) @ 100 Hz at gauge length
- Filter:** Selectable 100 Hz analog and 2 Hz - 3 kHz digital filters
- Temperature Range:** Standard (-ST) is to 1200 °C (2200 °F), optional (-HT) 1600 °C (2900 °F)
- Sensor Cables:** 2 m (6.5 ft) room temperature cables
- Output Cables:** Flexible 2.4 m (8 ft) analog output cables
- Coolant Interface:** Two barbed hose fittings for 1/8" (3.2 mm) ID coolant hoses
- Specimen Size:** Fits any flat cruciform or axial-only test specimen with a test area larger than the extensometer GL
- Operating Force:** <30 grams typical
- Contact Force:** <560 grams typical
- Environment:** Recommended for testing in dry air, inert / non-corrosive gases, or vacuum
- Power:** 100-240 VAC, 50-60 Hz, 15W; specify plug type when ordering

## OPTIONS

- High temperature option (-HT suffix) for use to 1600 °C
- Load frame mounting brackets
- Bulkhead adapters for use in vacuum chambers
- Model EPS170 constant-temperature recirculating chiller - see the Options tab on the web page for important details about liquid cooling requirements
- Connectors to interface to nearly any brand of test equipment

## ORDERING INFORMATION

Ceramic rod lengths are made to fit furnaces as required. Specify load frame configuration, loading axis orientation, furnace dimensions, and electrical outlet type at time of ordering.

Requires external mounting brackets and 110 - 240VAC / 4W electrical power.

Liquid cooling is recommended; required for 800 °C and above.

Other configurations are available with special order; please contact Epsilon to discuss your requirements.

Gauge Length (X & Y) <sup>1</sup>		Measuring Range (X & Y) <sup>1</sup>	
METRIC		METRIC	
-0125M	12.5 mm	-015M	+1.5 mm / -1.5 mm
-025M	25.0 mm	-020M	+2.0 mm / -1.0 mm
		-025M	+2.5 mm / -0.5 mm
U.S.A.		U.S.A.	
-0050	0.500"	-060T	+0.060" / -0.060"
-0100	1.000"	-080T	+0.080" / -0.040"
		-100T	+0.100" / -0.020"

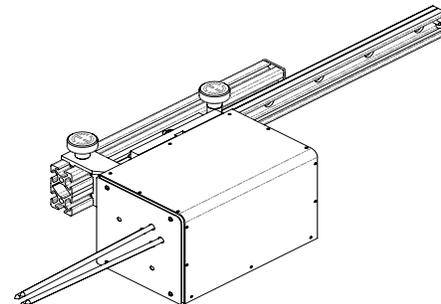
**Model Number 765I-** \_\_\_\_\_ - \_\_\_\_\_ - \_\_\_\_\_

Temperature Range	
-ST	Room temperature to 1200 °C (2200 °F)
-HT	Room temperature to 1600 °C (2900 °F)

<sup>1</sup> Consult factory for applications requiring different X and Y gauge lengths or measuring ranges.

Example: 7651-025M-020M-ST: 25 mm gauge length, +2.0 / -1.0 mm measuring range, standard temperature range (room temperature to 1200 °C)

Visit our website at [www.epsilontech.com](http://www.epsilontech.com)  
Contact us for your special testing requirements.



MODEL 7651 EXAMPLE