Long-Travel Extensometer
Series MFE

This semi-automatic extensometers are designed for testing on extensible materials as rubber, elastomers, plastics, films/foils, textiles and any other similar elastic materials.

Available are 900 mm and 1200 mm travel versions which both can be used with single column and dual column universal testing systems.
Both units offer motorized opening & closing of the measuring arms. The unit is well suited to be used up to specimen break including higher loads and brittle specimen materials.

The MFL can be connected to partly or fully automatic testing machines with hydraulic 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, the MFL extensometers are ideal for testing the deep-drawing properties of thin sheets.

The MFE units are also available for the use in environmental chambers with extended measuring arms.
The available temperature range is from -50°C to +350°C.

Key Features
- Accuracy grade 1 from 1 mm travel and accuracy grade 0.5 mm from 8 mm travel.
- Long measurement travel of 900 mm respectively 1200 mm
- Easy and quick adjustable gauge lengths from 10 mm to 100 mm in steps of 5 mm
- Automatic opening and closing of the measuring arms
- Low clamping and activating force
- Extensible with MFQ-A unit for additional transverse measurement

Option

- Environmental Version: With extended measuring arms for the use in combination with environmental chambers.
- Deflection Measurement: Measuring arm for deflection measurement during flexural (bending) tests.
- Measurement of Tube (Pipe) inner diameter
  from Ø100 mm to Ø1000 mm
- Measurement of ring stiffness according to ISO 9969
  from Ø50 mm to Ø900 mm
- Measuring direction downwards

Technical Data:

Type MFE	900	1200
Accuracy class EN ISO 9513 from 8 mm	0.5	0.5
Accuracy class EN ISO 9513 from 1 mm to 8 mm	1	1
Accuracy class EN ISO 9513 up to 1 mm	2	2
Accuracy class ASTM E83	B1	B1
Measurement principle	opto-incremental	opto-incremental
Measurement Encoders (2)	Heidenhain	Heidenhain
Travel (minus gauge length)	910 mm	1210 mm
Gauge length (L0) in steps of 5 mm (longer gauge lengths on request)	10 - 100 mm	10 – 100 mm
Indication error up to 1 mm*	6 µm	6 µm
Indication error (rel) up to 1 mm*	2%	2%
Indication error up from 1 mm*	3 µm	3 µm
Indication error (rel) up to 1 mm*	1%	1%
Resolution	1 µm	1 µm
Activating force	< 10 cN	<10 cN
Clamping force	150 cN	150 cN
Operating temperature range	0 – 50 °C	0 – 50 °C
Weight	approx. 32 kg	approx. 36 kg
* The larger of the values is admissible.		

Sample Dimensions	
Specimen diameter	Up to Ø 40 mm
Flat specimen	Up to thickness 30 mm x width 100 mm

The MFE Series is compatible and supplied with mounting bracket to all our electromechanical and hydraulic testing machines.

Available are the following mounting brackets:

- **Mounting Bracket** which allows to swivel the extensometer out of the testing space
- **Mounting Bracket** which allows withdrawing of the extensometer from the testing space
- **Mounting Bracket for Multiple Test Rooms**

Design and Function

The MFE will be operated at semi- and full automatic testing machines, particularly for applications, where the gauge length must not have to be changed very often.
The MFE works semi-automatic, the positioning of the measuring arms with respect to the middle of the sample as well as the setting of the initial gauge length has to be done manually (once before the test starts). Clamping and unclamping of the measuring arms respectively moving to the manually before adjusted position and gauge length will be done automatically (electrically motor-driven). As long as the Le-value and –position re-main unchanged no manual operation is required.
The MFE is suitable for nearly all samples (from a gauge length of Le 10 mm) up to sample rupture. Measuring direction upwards or downwards is available. The measuring heads may be removed from the device easily and quickly by means of a screw / insert system.
Measuring arms for climatic chamber (-50° … + 350° C) as well as a measuring arm for bending tests are available as an option.

Measuring signal

To record elongation two Heidenhain incremental encoders (ERO 1480 with 1500 Lines) are used. Each measuring head operates one incremental encoder which is evaluated through either of plugs X1 and X2. The sinusoidal incremental signals A and B are phase-shifted through 90° and have typical signal levels of 1 Vpp. The output signals initially have to be processed separately. Afterwards the signals have to be taken into account. The resolution may (depending on interpolation and method of counting) be smaller 1 µm (Recommended resolution 1 µm).