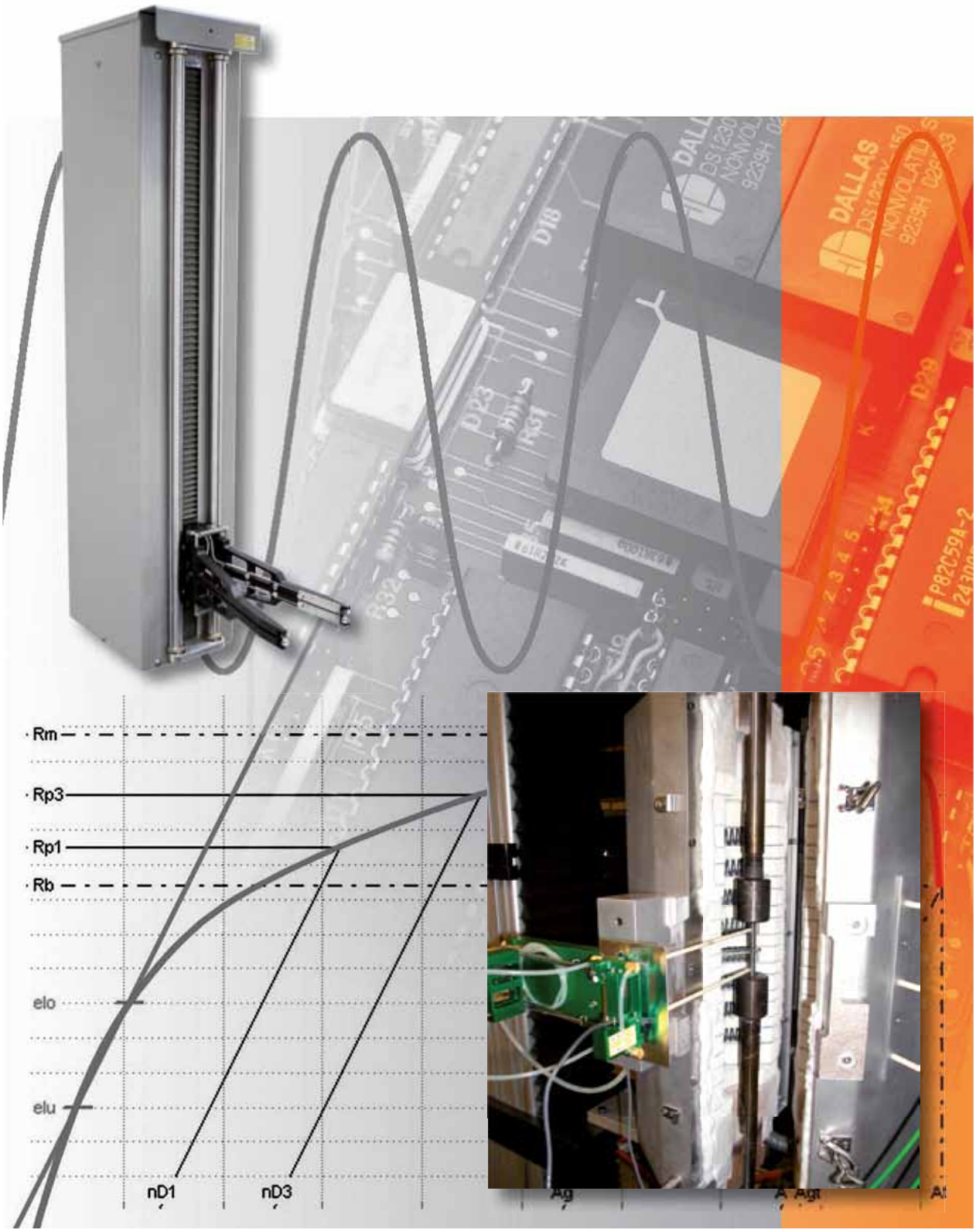
Extensometers
for Materials Testing



Extensometers
for Materials Testing

An accurate determination and evaluation of the specimen deformation is a fundamental requirement in many material tests.

By using an extensometer for direct extension measurement all additional deformation as load frame, load cell, grips or fixtures or strain in the non-parallel section of the specimen is excluded. The w+b testing machines can be equipped with direct contact or non-contacting extensometers. To challenge the wide range of applications w+b offers a comprehensive line of extensometers:

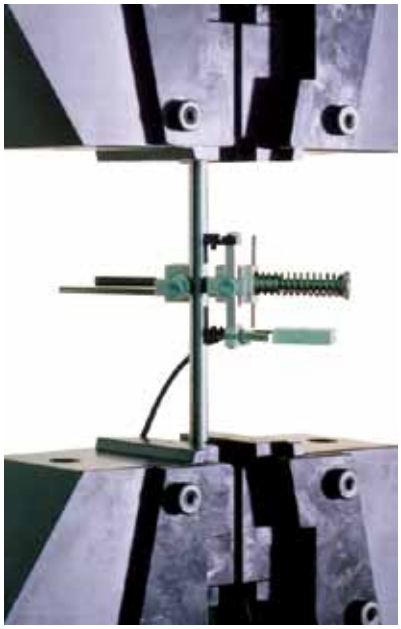
- **Axial Extensometers**
  such as clip-on, averaging, semi or fully automatic extensometers.
- **High Elongation Axial Extensometers**
  for measuring the strain of high elongation materials such as rubber, polyurethane a.s.o.
- **Diametral Extensometers**
  for measurement of the reduction in width, Poisson's ratio, r-value (vertical anisotropy).
- **Dynamic Extensometers**
  for measurement of cyclical and high frequency tests.
- **Fracture Mechanics Displacement Gauges**
  for determination of fracture toughness properties according to ASTM E1820 and for JIC KIC and R-Curves according ASTM E813.
- **Video Extensometers**
  for simultaneous measurement of both, axial and lateral deformation, ideal for plastics, rubber, textiles, wires and many more materials.
- **High Temperatures Extensometers**
  for the measurement inside high temperature furnaces, environmental and vacuum chambers or in connection with induction heating systems.
- **Axial / Torsional Extensometer**
  for simultaneous measuring of axial and torsional deflections on specimens tested in axial / torsional machines.

Content - Section Q

Clip-On Axial Extensometer

Type DD1 – 25 / 100

The DD1 – 25 / 100 is specially suitable for E-Modulus, Proof- and Yield Stress with flat and round specimen. One of the most precise, durable and repeatable strain measurement devices. With fast gripping system.



This extensometer is temperature compensated in the range of -10°C up to +60 °C. Stops at both sides protect the measuring assembly against mechanical overload if the forces are not greater than 3 N. The displacement to be measured is converted into a proportional electrical signal, where the linearity error being less than 0.05% over the whole measuring range. The DD1-25/100 with its quick attachment fixtures for both flat and round samples can easily be mounted on the samples with the possibility to adjust the clamping force with a high degree of sensitivity using the mounting clamps.

Features

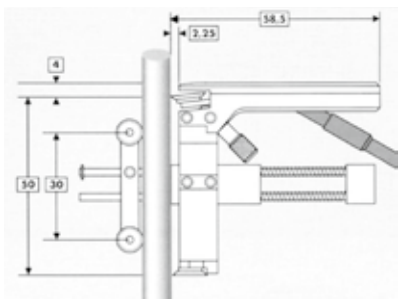
- Versatile transducer with strain gauge measuring system
- High accuracy
- Compact design

Technical Data	Type DD1 - 25 / 100
EN ISO 9513 Accuracy Class	0.5
Standard Initial Gauge Length	20 / 25 / 50 / 100 mm
Optional Gauge Length	30 / 40 to 90 / 110 to 200 mm
Measuring Range	± 2.5 mm
Linearity Error incl. Hysteresis	≤0.05 %
Dimensions Flat / Round Specimens	❑ 4 - 50 mm / Ø 5 - 50 mm

Clip-On Axial Extensometer

Type MINI MFA 2

Suitable for almost all types of samples up to Ø 25 mm or ❑ 25 x 25 mm and a gauge length Lo of 100 mm. Very high resolution and accuracy allow the determination of Young's modulus and the yield point RP0.2.



The extensometer permits quick and easy examination of a large number of test samples. Its low weight and minimal activating force make it especially suitable for small and notch sensitive samples. The measurement range amount to 2 mm in the positive (tensile) and 1 mm in the negative (compression) direction. The large adjustment range of the clamping force allows for the optimal adaptation to the tested material and the sample dimensions. Mechanical stoppers protect against unintended overloads, even in the case of premature breaking of the sample with the extensometer attached. The MINI MFA 2 has a gauge length Lo of 10 mm. With the basic model an extension arm for Lo 50 mm is provided. Further extension arms for Lo 10 to 100 mm can be supplied giving intermediate lengths. The clamping device if the MINI MFA 2 permits fast and unproblematic clamping and unclamping. Two MINI MFA 2 can be used with the double clamping device in order to average the strain for sample. For the double-side MINI MFA 2 as well as for thin round samples rectangular edges are recommended.

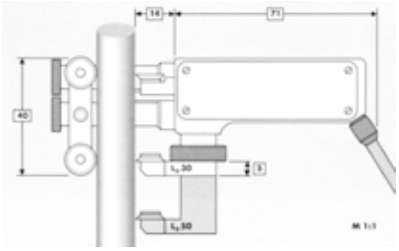
Technical Data	Type MINI MFA 2
EN ISO 9513 Accuracy Class	0.5
Standard Initial Gauge Length	10 mm
Optional Gauge Length	50 / 100 mm
Measuring Range	+ 2 mm / - 1 mm
Linearity Error incl. Hysteresis	0.05%
Dimensions Flat / Round Specimens	❑ 0 - 25 x 25 mm / Ø 0 - 25 mm

Clip-On Axial Extensometer

Type MFA 2 / 0.5

Particularly suitable for determining the module of elasticity, proof stress and ultimate strain. Suitable for all tests above an initial instrument length Lo of 25 mm.

Its measuring accuracy exceeds all requirement set down by standard EN ISO 9513. Its design, which has been tried and tested over many years of use, guarantees a high level of reliability and a long service life, even under difficult conditions. The MFA is fast, straightforward and easy to use, and therefore enables large numbers of tests to be carried out. A lever mounted in ball bearing, which have been tensioned to prevent play, and housed in a casing of a high strength aluminium ally is used to take up the clamping forces. The path of the test elongation is transferred to the measuring spring through this lever. If the measuring distance (path) is exceeded of the test piece breaks prematurely when the MFA is in use, the measuring spring is fully protected by stops. The Lo of the measuring instrument can be equipped for all required lengths from 25 to 300 mm. The extension arms can be changed quickly and without tools. The basic equipment comprised the extensions arms for Lo 30 (25) mm and Lo 50 mm. The clamping device facilities quick and easy clamping.



Technical Data	Type MFA 2	Type MFA 0.5
EN ISO 9513 Accuracy Class	0.2	0.2
Standard Initial Gauge Length	30(25) and 50 mm	30(25) and 50 mm
Optional Gauge Length	30 - 300 mm	30 - 300 mm
Measuring Range	2 (3) mm	0.5 mm
Linearity Error incl. Hysteresis	0.05 %	0.05 %
Dimensions Flat Specimens	❑ 0 - 30 x 30 mm / 0 - 60 x 60 mm with adapter	
Dimensions Round Specimens	Ø 0 - 30 mm / 0 - 60 mm with adapter	

Clip-On Axial Extensometer

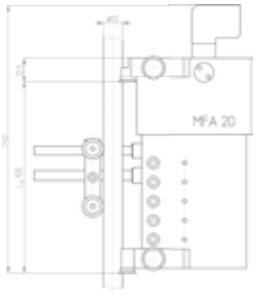
Type MFA 20

Suitable for determining the yield point and uniform deformation for samples above 4 mm diameter and 15 mm width. Extremely robust design for heavy duty service such as testing of construction steel and rough samples.

The MFA 20 consists of two casing halves which move parallel and easily towards each other on play-free guidance bars. The upper casing overlaps the lower casing for the total extension so that the parallel guide and the measuring system are protected from damage and dust. A measuring spring with a temperature compensated full bridge strain gauge serves as the measuring system for the MFA 20. The knife edge holders and the clamping device can be positioned easily by loosening just one knurled screw. Alignment pins fix them in their exact position. In order to achieve a symmetrical position of the counter rollers with respect to the knife edges, the counter roller fixture can be turned and the clamping device shifted in three steps. Opening width and clamping force are continually adjustable.

Features

- parallel-guided
- roller-bearing design, extremely robust design



Technical Data	Type MFA 20
EN ISO 9513 Accuracy Class	0.5
Standard Initial Gauge Length	50 - 100 mm (Steps of 10 (5) mm)
Optional Gauge Length	from 40 mm / up to 200 mm
Measuring Range	+ 20 mm
Linearity Error incl. Hysteresis	0.2%
Dimensions Flat Specimens	❑ 15 x 1 up to 30 x 30 mm (Option 60 x 60 mm)
Dimensions Round Specimens	Ø 4 - 30 mm (Option 60 mm)

Clip-On Axial Extensometer

Type MFA 25 / 12

Suitable for many specimens above an initial gauge length of Lo 25 mm. At a measuring path of 25 mm specially designed for metal and plastic. Specially the low tension causes only a little force on the specimen.

The measuring arms are made of a high strength aluminium alloy. Along with ball bearings which have been tensioned to prevent play the measuring arms are placed on the rotation point. This results in a simple but stable design which being easy to operate is suitable for a rational testing of a large number of test pieces. The measuring spring attached to the upper arm transfers the movements of the measuring direction only onto a fine, lapped surface of the lower arm. This prevents any form of distortion from either the clamping force or any other kind of force. As each measuring arm has its own counter roller the relative distance travelled by the backing rollers corresponds to the measuring path. Due to this, only very slight counter forces effect the test pieces. The non-linearity (< 0,5 % V.A) of the MFA 25 comes from its axis-suspension and its long measuring path of 25 mm. A special model of the MFA can be supplied for tests in the temperature range of +1°C to +220 °C.

Technical Data	Type MFA 25	Type MFA 12
EN ISO 9513 Accuracy Class	0.5	0.2
Standard Initial Gauge Length	25 and 50 mm (20 mm)	25 and 50 mm (20 mm)
Optional Gauge Length	30, 80 and 100 mm	30, 80 and 100 mm
Measuring Range	+ 25 mm	+ 12 mm
Linearity Error incl. Hysteresis	0.25 %	0.10 %
Dimensions Flat Specimens	❏ 0 - 28 x 30 mm / 0 - 50 x 50 mm with adapter	
Dimensions Round Specimens	Ø 0 - 28 mm / 0 - 50 mm with adapter	

Dynamic Clip-On Axial Extensometer

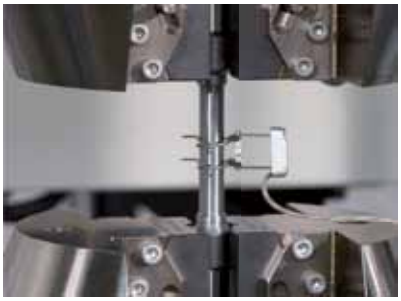
Series EXA

Specially designed for testing new materials, such as carbon fibres, ceramics a.s.o. as well as organic materials. It is characterised by very low weight, high natural frequency, and a high accuracy of ± 0.1 % of full scale.

It allows also dynamic endurance strength tests on very small specimens to be performed without giving problems. Attachment springs supplied will ensure quick and safe attachment to the specimen. The standard 60' knife edges can be replaced when worn in a matter of minutes. Upon special request, knife edges are available with different angles and supports and/or in other materials.

Application Range

- Tension / Compression Tests - Young-Modulus and Elastic Limit
- Low and High Cycle Fatigue Tests
- Deformation of Bending Tests



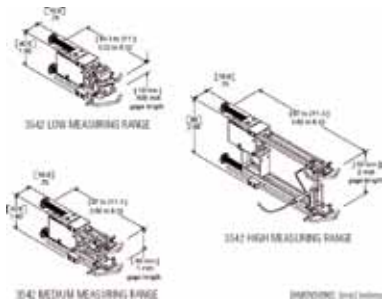
Technical Data	Series EXA
EN ISO 9513 Accuracy Class	0.5 - 1
Standard Initial Gauge Length	10 - 100 mm (in steps of 5 / 10 mm)
Measuring Range	0.25 - 10 mm
Linearity Error incl. Hysteresis	0.1 - 0.3 %
Operating Temperature	- 80°C - +120°C or -270°C - +220°C
Dimensions Flat Specimens	❏ 1 - 18 mm
Dimensions Round Specimens	Ø 1 - 18 mm

Clip-On Axial Extensometer
Series 3542

For Axial Tensile, Compression and Cyclic Testing of a wide range of materials, including metals, plastics, composites and ceramics. Optional with rubber or spring band attachment.

These extensometers are designed for testing a wide range of materials, including metals, plastics, composites and ceramics. All will work in both tension and compression. The dual flexure design makes them very rugged and insensitive to vibrations, which permits higher frequency operation. They have quick attach kit to make it easy to mount the extensometer on the test specimen in seconds with one hand. The quick attach kit can be removed, allowing mounting of the extensometer with springs or rubber bands. Operating Force <30g.

Features
- May be left on through specimen failure.
- All models can measure in both tension and compression and can be used for cyclic testing.
- Rugged, dual flexure design for strength and improved performance. Much stronger than single flexure designs, this also allows cyclic testing at higher frequencies.
- Options: adapter kits to change gauge length and speciality knife edges.



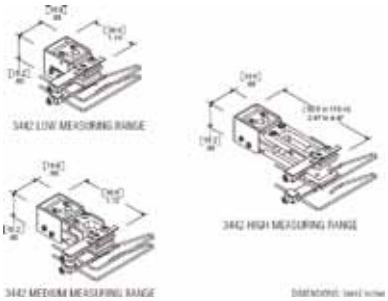
Technical Data	Series 3542
EN ISO 9513 Accuracy Class	0.5
Standard Initial Gauge Length	10, 12.5, 25, 50 mm
Measuring Range	±5, ± 10, ± 20, ± 25%, +50 / - 10%, +100 / - 5 %
Linearity Error incl. Hysteresis	0.10 % (for ± 5 and 10%), 0.15 % (rest)
Operating Temperature	-265°C up to +175°C
Dimensions Flat Specimens	❏ 0 - 12 x 31 mm
Dimensions Round Specimens	Ø 0 - 25 mm

Axial Miniature Extensometer
Series 3442

These units are widely used for testing small and delicate samples. Ideal for biomedical tests, as well as for wire and thin sheet materials. Also great for low cycle fatigue testing where short samples are used.

Weighing as little as 8 grams, these tiny extensometers also have very low operating force, resulting in low specimen contact force and influence. All use a proprietary dual flexure design, which makes them very rugged for their size. Most are only 15.25 mm tall. These extensometers will fit in the small space between grips, which usually results when small test samples are used. The 3442 are strain gauged devices, making them compatible with any electronics. Optional with sring or rubber band attachment.

Features
- Mechanical over travel stops in both directions.
- Hardened tool steel knife edges are easily replaced. Optional special coatings and stainless steel knife edges available for biomedical tests.
- Rugged, dual flexure design for strength and improved performance. Much stronger than single flexure designs, this also allows cyclic testing at higher frequencies.



Technical Data	Series 3442
EN ISO 9513 Accuracy Class	0.5
Standard Initial Gauge Length	3, 4, 5, 6, 8, 10, 12 mm
Measuring Range	±5, ±10, +20 / - 10%, +50 / - 5%, +100 / - 5 %
Linearity Error incl. Hysteresis	0.10 % (for ± 5 and ± 10%), 0.15 % (rest)
Operating Temperature	-265°C up to +175°C
Dimensions Flat Specimens	❏ 0 - 12 x 25 mm
Dimensions Round Specimens	Ø 0 - 12 mm

Axial Long Gauge Length Extensometer
Series MFI

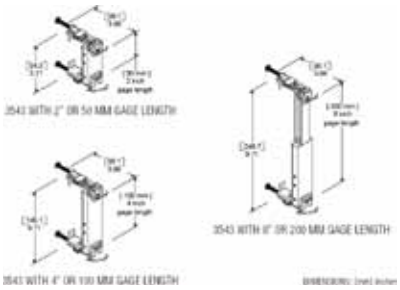
Parallel guided design measuring the deformations of samples with a large gauge length Lo up to 1000 mm. Specially suitable for wire cables, chains, construction concrete and steel rods, belts, ropes a.s.o.

It can be operated in horizontal and vertical testing machines. In spite of its sturdy construction and the large Lo variation, it is easy to operated due to its low weight. The MFI comes in a tubular design that extends like a telescope. The measuring system, a well protected inductive transducer, is mounted at its centre. The clamping elements are arranged at the ends of the instrument, so that Lo can be utilised to almost the grips of the testing machine. On the clamping elements five knife edges are arranged in a circular arc, which attach firmly to round, twisted or plaited samples form 3 to 35 mm diameter. The edges are circular and can be rotated. A long life is achieved by using the whole perimeter. For find adjustment of clamping a spindle with a spring loaded pressure plat is arranged facing the knife edges. A combination of different extension tubes allow the extension of the basic Lo to any length up to 1 m. For a tensile test no adjustment or unbolting on the MFI is needed. By setting the MFI to the gauge length , the clamping elements centre themselves in such a way during clamping the instrument aligns itself parallel to the samples axis.

Technical Data	MFI 20	MFI 40	MFI 100
EN ISO 9513 Accuracy Class	1	1	1
Standard Initial Gauge Length	225 mm	250 mm	300 mm
Optional Gauge Length	226 - 1000 mm	251 - 1000 mm	301 - 1000 mm
Measuring Range	+ 20 mm	+ 40 mm	+ 100 mm
Linearity Error incl. Hysteresis	0.2 %	0.2 %	0.2 %
Dimensions Round Specimens	Ø 3 - 35 mm	Ø 3 - 35 mm	Ø 3 - 35 mm

Axial Long Gauge Length Extensometer
Series 3543

These extensometers are specially designed for long samples are ideal for testing steel re-bar, weld joints, and wire materials. It is a uniquely designed unit that may be left on through specimen failure.



The unique pull-apart design protects the extensometer when the specimen fails. These are tension only units. During operation, the upper half of the extensometer pulls out of the main body. Tapered measuring beams activate strain gauged flexures within the unit. This unique design allows long measuring ranges, yet retains the compatibility with electronics for strain gauged transducers. These models offer high accuracy and are light weight but rugged, with low operating force. The units have hardened tool steel knife edges. Standard quick attach wires provided with the extensometer work on flat specimens up to 12 x 31 mm and on rounds up to 25 mm diameter. Optional quick attach kit wire forms are available for use on larger samples. Specifically designed to be left on through specimen failure. The unit is designed so that the two halves of the extensometer come apart to prevent damage at specimen failure. The optional gauge length spacers allow the gauge length to be easily increased.

Technical Data	Series 3543
EN ISO 9513 Accuracy Class	0.5
Standard Initial Gauge Length	50, 100, 150, 200 or 250 mm
Measuring Range	+25, +50, or +100 mm
Linearity Error incl. Hysteresis	≤ 0.15%
Dimensions Flat Specimens	❑ 0 - 12 x 31 mm
Dimensions Round Specimens	Ø 0 - 25 mm
Temperature Range	ST -40°C - +100°C or HT -40°C - +1500°C
Typical Operating Force	125 g

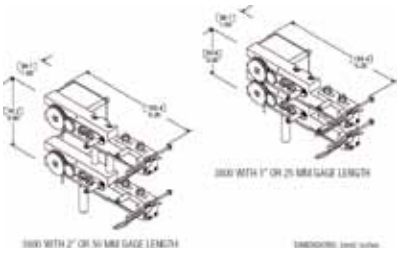
Axial Long Travel Extensometer
Series 3800

Designed for plastics, rubber and elastomer testing, these extensometers have very long measuring ranges. Their unique design allows testing to failure and minimizes interaction with the sample.

The main body of this unique extensometer remains stationary during testing, held in position by the adjustable magnetic base included. Only the very light, small travelling heads move as the sample elongates during a test. These attach to the sample with small spring clips. Each head pulls a cord out from the extensometer as the head moves. These models use high precision, low friction potentiometers, and, as a result, have a wide range of factory selectable outputs. The extensometer is driven by an excitation voltage and has output proportional to the input. They can be provided with high level outputs (approximately 2-8 VDC) or ones that mimic strain gauged devices (2-4 mV/V).

Features

- May be left on through specimen failure. The main body is stationary with only the lightweight travelling heads moving.
- Comes with an adjustable magnetic base for easy mounting.
- Low cost, high accuracy elastomers strain measurement.



Technical Data	Series 3800
EN ISO 9513 Accuracy Class	0.5
Standard Initial Gauge Length	25 or 50 mm
Measuring Range	+125, +250 or +500 mm
Linearity Error incl. Hysteresis	≤0.15%
Typical Operating Force	20 g

Automatic Long Travel Extensometer
Series MFE

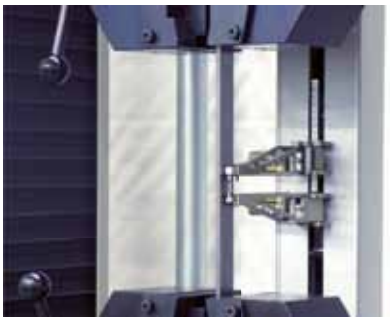
Specially designed for highly lengthening materials such as plastics and rubber, incorporating long travel up to 900 mm. The MFE complements relatively low-cost instruments used for the testing of plastics.

Particular attention has been paid to price and functional performance in the design and construction of the device. The MFE has a smooth-running, near-frictionless guidance system (comparable to air-guidance), which in conjunction with the newly designed measuring system, guarantees a robust and reliable basis for measurement. The MFE works semi-automatically, indicating position relative to a manually set initial gauge length and incorporating electric motors to open and close the measuring arms. All of these functions are computer-controlled and in situations where the initial gauge length and the position of the sample are unchanged, no manual adjustment is necessary. Elongation is recorded by means of an opto-incremental measuring system. The MFE may be configured with either downward or upward measurement directions. The measuring arms may be easily and quickly removed from the device by unlocking two screws with pin guidance.

Technical Data	MFE 900
EN ISO 9513 Accuracy Class	2
Standard Initial Gauge Length	10 to 100 mm in steps of 10 mm
Measuring Range	910 mm minus Lo
Linearity Error incl. Hysteresis	0.20 %
Dimensions Flat Specimens	❑ 0 - 30 x 100 mm
Dimensions Round Specimens	Ø 0 - 30 mm

Manual / Automatic Axial Extensometer
Series MFN

Available in 14 models with different measuring systems for different elongation and in automatic or manual mode.



Dual Range MFN - A
offers both small (4 mm, achieves the highest measurement accuracy) and large measuring range. MFN - A is highly suitable for determining the Young's Modulus and for recording fracture elongation Lo+DL = 800 mm.

Long Path MFN - B
Offers only the large measuring range. It serves in measuring large sample extensions as observed in elastomers.

Short Path MFN - C
Offers only the small measuring range (4 mm). The guided length of 500 mm serves to move the arms with respect to the sample centre and to adjust them for different clamping heights. In the manual version the measuring arms must be opened, closed and pushed to the Lo-stop by hand. In the automatic version the measuring arms are opened, closed and set at the manually preset Lo and position by an electrical motor. These functions may be controlled by a PC.

Technical Data	MFN - A	MFN - B	MFN - C
Digital	4 + 300 mm	300 mm	
Standard	4 + 500 mm	500 mm	+ 4 mm
Long	4 + 800 mm	800 mm	

Technical Data	Short Path	Long Path Digital	Long Path Analog
Measuring Ranges	+ 4 mm	300 mm	500 or 800 mm
EN ISO 9513 Accuracy Class	0.2	2 (0.5 for > 4 mm)	1 for > 4 mm
Standard Initial Gauge Length	50 (10 - 25 option)	10 - 100 mm	100 - 100 (250) mm
Linearity Error incl. Hysteresis	0.06 %	0.01 %	0.025%
Specimen Dimensions	❑ 0 - 30 x 70 mm / Ø 0 - 30 mm		

Fully Automatic Axial Extensometer
Series MFL

For use in connection with fully automatic testing machines. Low clamping force combined with the high measurement accuracy makes it suitable even for small, notch sensitive test samples.

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 MFQ, the MFL is highly suitable for testing the deep-drawing properties (vertical anisotropy r) of thin sheets. Each one of the four measuring arms of the MFL has 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- tacho 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.

Technical Data	MFL 300	MFL 500
EN ISO 9513 Accuracy Class	0.5	0.5
Standard Initial Gauge Length	from 10 mm	from 10 mm
Positioning Distance	200 mm	200 MM
Measuring Range	300 mm minus Lo	490 mm minus Lo
Linearity Error incl. Hysteresis	0.005 %	0.005 %
Dimensions Flat Specimens	❑ 0 - 30 x 50 mm	❑ 0 - 30 x 50 mm
Dimensions Round Specimens	Ø 0 - 80 mm	Ø 0 - 80 mm

Fully Automatic Axial Extensometer
Series MFX

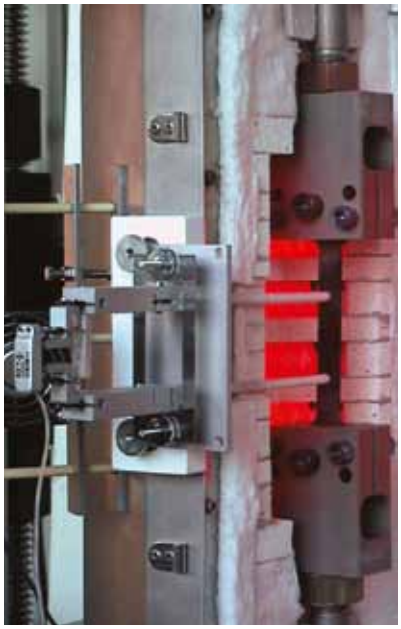
For use in connection with fully automatic testing machines. Because of its rugged construction and the high accuracy the Series MFX nearly meets all applications in measurement of linear strain.

The MFX is suitable for almost all samples of a gauge length (Lo) from 10 mm. Because of its rugged construction and high accuracy the MFX nearly meets all applications in measurement of linear strain (determination of the E-modulus up to sample fracture). The MFX works without restrictions in both the upper as well as the lower test area. When used in combination with the MFQ-A the MFX is highly suitable for testing the deep-drawing properties (vertical anisotropy r) of thin sheets. The MFX has a smooth running and nearly frictionless linear guidance of the measuring heads. Due to the noncontact incremental gauge the MFX meets all requirements of class 0.5 over the whole travel. By moving the upper measuring head manually the initial gauge length can be increased for 100 mm without any restriction of the measuring travel. The MFX can be controlled via a PC. The built in measuring system is a noncontact type. Maximum resolution 0.1 µm. Clamping Force 50 - 100 cN. Activating Force max. 10 cN.

Technical Data	MFX 900
EN ISO 9513 Accuracy Class	0.5
Standard Initial Gauge Length	10 - 200 minus travel
Measuring Range	200 minus Lo
Positioning Range	120 mm without restriction of travel
Linearity Error incl. Hysteresis	0.005 %
Dimensions Flat Specimens	❑ 0 - 50 x 150 mm
Dimensions Round Specimens	Ø 0 - 50 mm

High Temperature Axial Extensometer
Series EXH

For measurement in radiation or three-zone heating furnaces with up to 1200 °C. Measurement data are transmitted from the specimen through the furnace to the extensometer via two ceramic rods fitted at both ends.

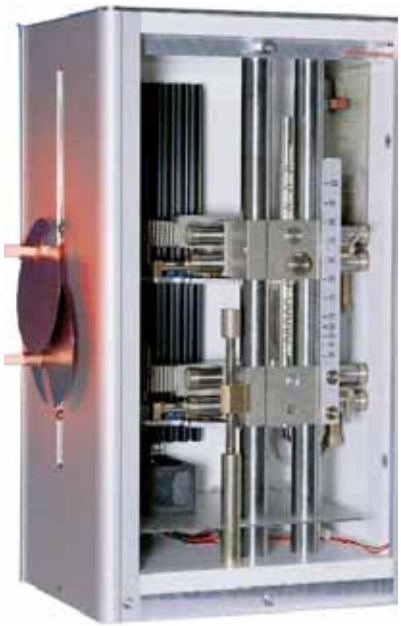


The Extensometer is provided with a special spring enabling it to be attached elastically to the heat chamber or machine frame. Movements on the machine are thus not registered as measurement errors at the extensometer. This spring, in conjunction with two knurled nuts, presses the transmission rods quickly and securely to the specimen. If, when hard materials are tested, the ceramic rods should slip, a special punching device, from the range of accessories, is available to prevent that this happens. This will provide on the specimen two centring points on the specimen to accommodate the rod tips. A heat screen protects extensometers from excessive heat. Ideal for accurate measuring strain in high-temperature tension, compression and through-zero fatigue testing applications. For use at temperatures up to 1'200°C and with optional water cooling up to 1'800°C. Secure stain measurement without slippage with elastically low contact force minimizes the possibility of damage to the specimen. Activation force only 2 N.

Technical Data	Series EXH
EN ISO 9513 Accuracy Class	1
Standard Initial Gauge Length	15, 20, 25, 30 or 50 mm (1.25 - 10 mm optional)
Measuring Range	0.75 - 10 mm
Linearity Error incl. Hysteresis	0.25 %
Operating Temperature	up to 1200°C (with option up to 1800°C)

High Temperature Axial Extensometer
Series MFHT

Conceived as a highly accurate, sturdy measuring device for hot tensile tests in a folding furnace up to 1700°C. The temperature range depends on the material of the feeler arms which are easy to exchange.



Initial measuring lengths from 10 to 100 mm may be set quickly and easily. Due to its extremely low actuating force, the unit enables the testing of highly sensitive samples which permit only the lowest surface pressures. Built-in heating elements maintain an adjustable constant temperature inside the measuring unit. The feeler arms are mounted on levers which are locked free from float in pivot bearings. Measuring springs which are applied by full bridge resistance strain gauges are actuated via these pivots. Coil springs press the feeler arms which are driven by a motorized spindle drive gently against the sample. In addition the drives release both L0 limit stops prior to measuring in order to prevent the application of preload force to the feeler arms. The feeler arms can be controlled by means of a control cassette which is part of the device or by a computer with relay board. The cassette also contains the programmable temperature control. A ventilator provides even temperature distribution within the MFHT.

Technical Data	Type MFHT
EN ISO 9513 Accuracy Class	0.2
Standard Initial Gauge Length	15, 20, 25, 30 or 50 mm
Measuring Range	10 or 8 mm
Linearity Error incl. Hysteresis	0.05 %
Operating Temperature	up to 1700°C

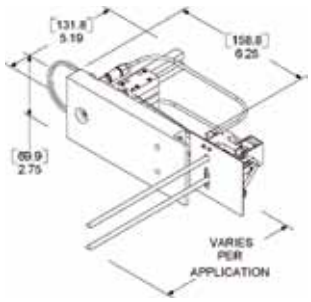
High Temperature Axial Extensometer
Series 3548

High temperature extensometers for use in side cut-out, split type materials testing furnaces. Water cooled and furnace bracket mounted for use to 1200 °C. The high temperature option allows use up to 1600 °C.

These extensometers mount on a water-cooled bracket mounted on the furnace side cut-out or with other support brackets. The standard temperature version (to 1200 °C) is supplied with high purity alumina rods. The high temperature option is furnished with alpha grade silicon carbide rods. Rods are made to order to the length required for your furnace. Mounting brackets may be integrated with the furnace cut-out. Optional load frame mounting brackets can be provided.

Features
- May be left on through specimen failure.
- All models can measure in both tension and compression and can be used for cyclic testing.
- Mechanical over travel stops in both directions.
- Rugged, dual flexure design for strength and improved performance.
- Optional versions for use in vacuum environment upon request!

Rod Tip Styles
- Straight Chisel for flat & round specimens
- Vee Chisel for round specimens only
- Conical Tip for flat specimens only



Technical Data	Series 3548
EN ISO 9513 Accuracy Class	0.5
Standard Initial Gauge Length	10, 25 or 50 mm
Measuring Range	± 10 %, ± 20%, + 50 % / - 25 %, + 100 % / - 5 %
Linearity Error incl. Hysteresis	≤0.15 mm
Operating Temperature	Standard ST up to 1200°C, Option HT up to 1600°C

High Temperature Axial Extensometer
Series EXAE

Specially designed for LCF (Tensile, Compression or Through-Zero), Creep or Relaxation Testing. Can be perfectly used in combination with dynamic rated hydraulic or manual high temperature grips Series HTG.

The EXAE Extensometer with replaceable inserts is available for testing different bars. It is mechanically operated and features double telescoping rod and tube construction with a variable gauge length of 25 to 152.4 mm. Different specimen geometries can be accommodated with the appropriate replaceable knife-edges which are easy change or replaced when they become dull. The two precision displacement transducers are placed outside of furnace with attachment to specimen by means suspension arms. The EXAE extensometers features excellent concentricity with very low specimen bending and assure no slippage-free testing. Zero Temperature Coefficient ±0.01% F.S. /°C, Span Temperature Coefficient ±0.01% F.S. /°C.

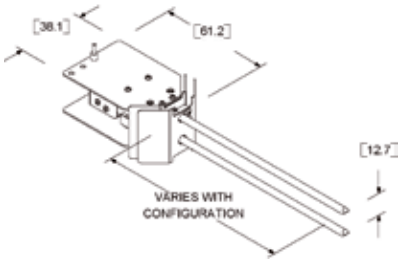
Features
- Ideal for accurate measuring strain in high-temperature tension, compression and through-zero LCF testing applications.
- For use at temperatures up to 1200°C.
- Secure stain measurement without slippage.

Technical Data	Series EXAE
EN ISO 9513 Accuracy Class	0.5
Standard Initial Gauge Length	25 - 152.4 mm
Measuring Range	5, 10, 15, 20, or 25 mm
Linearity Error incl. Hysteresis	0.10 %
Operating Temperature	1000°C, 1100°C or 1200°C

HT Self-Supporting Axial Extensometer

Series 3448

Designed for use with high temperature furnaces or induction heating systems. The units are held on the specimen by light, flexible ceramic fiber cords. These make the extensometer self-supporting on the specimen.



The units are held on the specimen by light, flexible ceramic fiber cords. These make the extensometer self-supporting on the specimen. No furnace mounting brackets are required. The side load on the test sample is mostly eliminated because of the self-supporting design and light weight of the sensor. The combination of radiant heat shields and convection cooling fins allow this model to be used up to 1200 °C without any cooling. High purity alumina (min 99.7%) ceramic rods are used with either chisel, vee chisel or conical contact points as desired. Tensile, compression and cyclic tests like low cycle fatigue can all be performed with a single unit.

Features

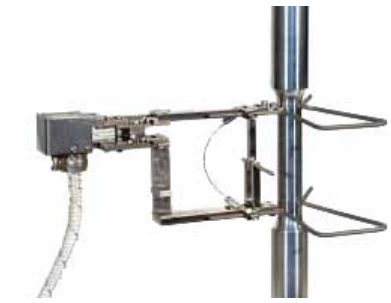
- May be left on through specimen failure.
- Mechanical overtravel stops in both directions.
- Use without cooling to 1200 °C. Optional small fan improves stability at highest temperatures.
- May be used on nearly any furnace with side entry cut-out for extensometers.
- Alternate configuration available for insertion between coils of induction heaters.

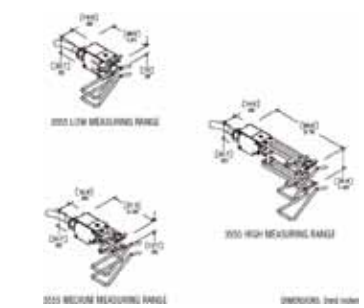
Technical Data	Series 3448
EN ISO 9513 Accuracy Class	0.5
Standard Initial Gauge Length	10, 25 or 50 mm
Measuring Range	±5, ± 10, ± 20, +50 / - 20%
Linearity Error incl. Hysteresis	< 0.15 %
Operating Temperature	Ambient up to 1200°C

HT Un-Cooled Axial Extensometer

Series 3555

For use in environmental chambers where the entire extensometer must be exposed to elevated temperatures. These capacitive extensometers may be used up to 540 °C without any cooling.





These extensometers use a high temperature capacitive sensor and do mot require any cooling. They will operate up to the maximum temperature limit of most environmental chambers used in material testing. The Series 3555 is ideal for testing of composites, metals and high temperature polymers in tensile, compression of cyclic testing. All units can be displayed in both compression and tension. The extensometer can also be used for strain controlled tests like low cycle fatigue.

Features

- All models can measure in both tension and compression and can be used for cyclic testing.
- Rugged, dual flexure design for strength and improved performance. Much stronger than single flexure designs, this also allow cyclic testing at higher frequencies.
- Recommended for elevated temperature testing in air or some other gases.

Technical Data	Series 3555
EN ISO 9513 Accuracy Class	0.5
Standard Initial Gauge Length	10, 25 or 50 mm
Measuring Range	±5%, +10% / -5%, +20% / -10%, +50% / -10%
Linearity Error incl. Hysteresis	0.10 %
Operating Temperature	Ambient up to 540°C
Dimensions Flat Specimens	❑ 0 - 12 x 19 mm
Dimensions Round Specimens	Ø 0 - 12 mm

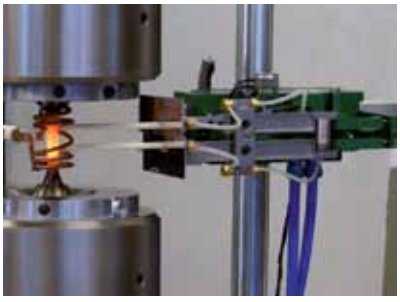
HT Capacitive Axial Extensometer
Series 3648

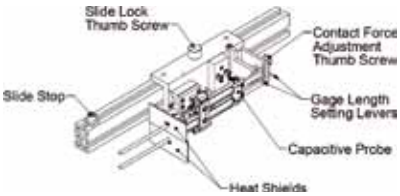
Features very low specimen contact force and are available in low strain ranges for use with induction heating systems. Water-cooled and mounted to a slide bracket, these are for use to 1200 °C, optional up to 1600 °C.

These extensometers use a high temperature capacitive sensor in combination with an innovative design to achieve high accuracy strain measurements in low measuring ranges not possible with other high temperature extensometers. These extensometers mount on a slide bracket that can attach to the load frame of your test system; optional load frame mounting brackets are available. The standard temperature version is supplied with high purity alumina rods. The high temperature option is furnished with alpha grade silicon carbide rods. Optional load frame mounting brackets. Rod tip styles standard chisel, vee-chisel or conical point.

Features

- All models can measure in both tension and compression and can be used for cyclic testing.
- Mechanical over travel stops in both directions.
- Innovative slide mount allows the extensometer to engage the specimen once the test temperature has been achieved.
- Low strain range, high resolution versions available.
- Typical operating force <10 g. Contact force up to 150 g (30 - 50 g typically.)





Technical Data	Series 3648
EN ISO 9513 Accuracy Class	0.5
Standard Initial Gauge Length	10 or 25 mm
Measuring Range	between +0.25 and 2.5 mm upon request!
Linearity Error incl. Hysteresis	0.10 %
Operating Temperature	Standard up to 1200°C. HT-Option up to 1600°C.

HT Axial Extensometer
Series HTV

Specially designed for use with high temperature furnaces up to 1200°C or 1500°C. Automatic recognition of contact with the specimen and automatic stopping.

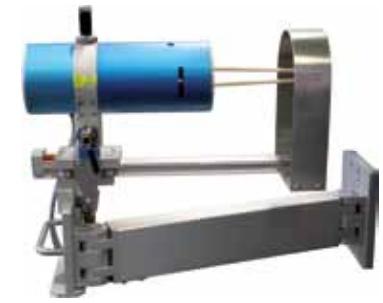
These high-temperature extensometers feature a plug-in module for stylus approach control to the surface of the specimen with automatic recognition of contact with the specimen and with automatic stopping when adequate contact force has been generated at the specimen (module installed to the temperature controller's electrical cabinet). This extensometer having a measuring travel of 10 mm or 0 / +20 mm and adjustable gage length from Lo 10 to 50 mm.
Including extensometer mounting device for swivelling and movable installation of the HTV extensometer on the testing machine.

Series HTV – A with Motorized Stylus Approach

to the surface of the specimen by electric motor

Series HTV – M with Manual Stylus Approach

to the surface of the specimen by hand-wheel



Technical Data	Series HTV
EN ISO 9513 Accuracy Class	1
Standard Initial Gauge Length	10 to 50 mm (10 to 70 mm optional)
Measuring Range	± 10 mm or 0 / + 20 mm
Linearity Error incl. Hysteresis	0.25 %
Operating Temperature	up to 1200°C or up to 1500°C)

Clip-On Transversal Extensometer

Series MFQ - H and Series MFQ - R

Series MFQ - H: Determination of the 'r-value' (vertical anisotropy) on metal sheets

Series MFQ - R: Determination of the 'Poisson' value on round samples

Whereas the MFQ-R is infinitely variable to each diameter of specimens the MFQ-H is equipped with fixed B0-stops for fixed initial width of metal sheets. The stoppers are easy and quick to change without any tools. MFQ-H and MFQ-R are both deliverable with two measuring locations (parallel switched for determination of the average value) as well as with only one measuring location. Sensitivity 2 mV/V. Pressing force of the measuring pin 4 N / 2 N.

Features

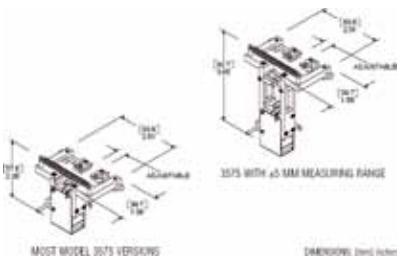
- Low weight
- Comfortable clamping
- Easy adjustment to different diameters of specimens
- Maintenance of the position of the measuring points also during the tension test through a smooth-running guide rail system (MFQ with two measuring locations)

Technical Data	MFQ - H	MFQ - R
EN ISO 9513 Accuracy Class	0.2	0.2
Measuring Range	4 mm (6 mm optional)	4 mm (6 mm optional)
Linearity Error incl. Hysteresis	0.05 %	0.05 %
Measuring Range	300 mm minus Lo	490 mm minus Lo
Specimen Thickness Flat Samples	0.4 - 30 mm	0.4 - 30 mm
Specimen Widths Fixed Flat Samples	13, 20, 25, 30 mm	4 - 25 mm (50 mm)
Specimen Diameter Round Samples	-	4 - 25 mm (4 - 50 mm)

Clip-On Transversal Extensometer

Series 3575

Designed for general purpose transverse or diametral strain measurement on axially loaded specimens. This model may be used simultaneously with the Model 3542 axial extensometer.



Self-supporting on the test sample, these extensometers will work on any width or diameter specimen from 0 to 25 mm. They are commonly used for measurement of Poisson's ratio, for transverse measurements with anisotropic materials like many composites and for sheet metal testing such as r-value determination. Most often they are used simultaneously with axial extensometers. These units easily clip onto the sample, held in place with an integral spring. Rounded contact edges maintain the position on the specimen.

Features

- May be left on through specimen failure.
- All models will measure both positive and negative displacements.
- Rugged, dual flexure design for strength and improved performance. Much stronger than single flexure designs, this also allows cyclic testing at higher frequencies.
- Easy to mount, with integral springs to keep the extensometer on the sample.
- Self-supporting on the specimen.
- Optional with speciality knife edges.

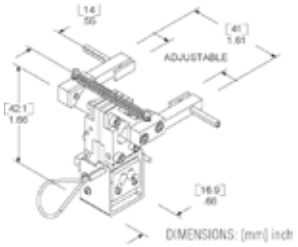
Technical Data	Series 3575
EN ISO 9513 Accuracy Class	0.5
Measuring Range	± 0.5, ± 1, ± 2.5, ± 3 or ± 5 mm
Linearity Error incl. Hysteresis	≤0.15 mm
Operating Temperature	- 265 °C up to +175°C
Dimensions Flat Specimens	❑ 0 - 25 mm
Dimensions Round Specimens	Ø 0 - 25 mm

Miniature Transversal Extensometer
Series 3475

A miniature extensometer designed for general purpose transverse or diametral strain measurements on small or thin specimens. May be used simultaneously with the Model 3442 or Model 3542 axial extensometers.

These very lightweight extensometers are self-supporting on the test sample. They are used for measuring the transverse or diametral strain. Often they are used simultaneously with an axial strain measuring extensometer to determine Poisson's ratio. They also are used for characterizing materials with anisotropic properties, such as with many composite materials. This model clips easily onto the sample with an integral spring to hold the unit in place. It can be adjusted to work on any size sample from 0 to 25 mm width or diameter. The Model 3475 has an arm thickness of only 3.81 mm, and will work simultaneously with any axial extensometer having sufficient clearance between arms (not all versions of the 3442 miniature extensometer can be used). Large radius contacts prevent the unit from digging into the samples. This model utilizes a dual flexure design, allowing use in dynamic applications. All units have measuring ranges in both directions.

Features
- May be left on through specimen failure.
- Rugged, dual flexure design for also cyclic testing at higher frequencies.



MODEL 3475 WITH ±1 MM MEASURING RANGE

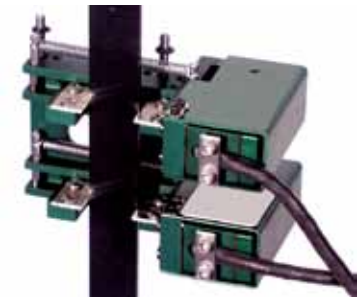
Technical Data	Series 3475
EN ISO 9513 Accuracy Class	0.5
Measuring Range	± 0.25, ± 0.50, ±1.00, ± 1.25 mm
Linearity Error incl. Hysteresis	0.15 % (± 1.25 mm 0.20 %)
Operating Temperature	- 265 °C up to +175°C
Dimensions Flat Specimens	❑ 0 - 25 mm
Dimensions Round Specimens	Ø 0 - 25 mm

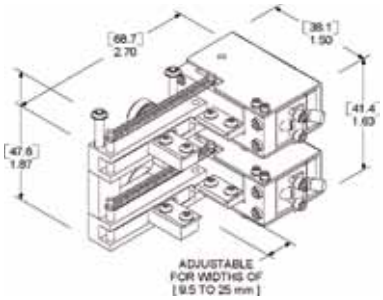
Transversal Averaging Extensometer
Series 3575 AVG

Designed for measuring r-values in sheet metal testing, this extensometer averages the lateral strain at two locations. This model may be used simultaneously with the Model 3542 axial extensometer.

This extensometer is self-supporting on the sample. It has rounded contact edges which measure the sample at two locations. As the test sample is pulled, the contact edges follow the part of the sample they were mounted on, measuring lateral strain on the sample at the same location throughout the test. The extensometer has a single output, which is the average of the two lateral measurements. These extensometers are used with a 50 mm gauge length Model 3542 extensometer, which measures the axial strain.

Features
- May be left on through specimen failure.
- Rugged, dual flexure design for strength and improved performance. Much stronger than single flexure designs.
- Self-supporting on the specimen
- Measuring range of or 2 mm (specify).
- Single clip-on unit directly measures lateral strain as an average of two locations.
- Greatly speeds up testing and allows digital data collection as compared to manual measurements.



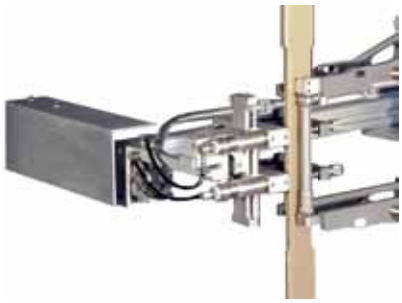


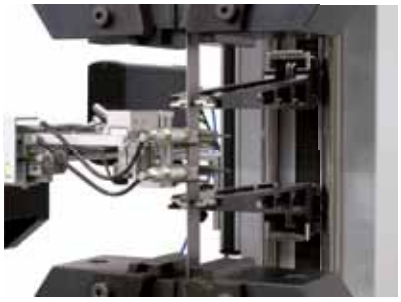
Technical Data	Type 3575 AVG
EN ISO 9513 Accuracy Class	0.5
Measuring Range	2 mm
Linearity Error incl. Hysteresis	≤0.15 %
Operating Temperature	- 265 °C up to +175°C
Dimensions Flat Specimens	❑ 9.5 - 25 mm

Automatic Transversal Extensometer

Series MFQ - A

Specially designed for the determination of the r-value (vertical anisotropy) of fine sheet metal specimens. Equipped with two measuring clamps, forming the average value of two separate measuring locations.





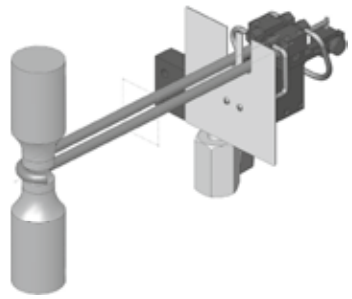
They are weight-compensated and mounted in smooth-running guides. The two measuring arms apply the lateral change to the measuring springs with their integrated full bridge strain gauges. Pneumatic cylinders allow to retract and swing them out of the way. The position of the measuring arms remains constant during the equally applied extension of the specimen. The position of the measuring arms remains stationary relative to the specimen during the uniform elongation. The measuring arms are always dragged together with the specimen. The pressing force of the measuring arms is very faint, and a hinge mechanism with all degrees of freedom lines itself up very gently, therefore very thin sheet metal, down to 0.2 mm can be measured. The MFQ-A is automatically brought into contact with the specimen utilising a pneumatic sled. When uniform stretching is completed, this movement is reversed, to swing the unit out of the way. An electronic controller board drives the MFQ-A from the PC.
Pressure of the measuring pins 2N. Pressurised air consumption ca. 1 l / min. Pneumatic working pressure ca. 4 bar.

Technical Data	Type MFQ - A
EN ISO 9513 Accuracy Class	0.2
Measuring Range	4 mm (6 mm optional)
Linearity Error incl. Hysteresis	0.05 %
Dimensions Flat Specimens Width	13, 20, 25, 30 mm
Dimensions Flat Specimens Thickness	0.2 - 10 mm

High Temperature Diametral Extensometer

Series 3580

Designed for transverse or diametral strain measurements at temperatures up to 1000°C. For use with furnaces having a side entry slot or with induction heating systems. They utilize a proprietary, rugged dual flexure design.



This model is for general purpose diametral strain measurement and is often used on hourglass specimens where a normal axial extensometer won't work. Quartz rods and water cooling allow the unit to be used for high temperature testing of metals, ceramics and composites. With induction heating, this model often can be used without water cooling. When used in furnaces, the extensometer is often mounted directly on a flat on the side of materials testing furnaces. Alternately, load frame mounting brackets are optionally available for supporting the extensometer. Quartz rod lengths are made to fit furnaces as required.

Features

- May be left on through specimen failure.
- Rugged, dual flexure design for strength and improved performance. Much stronger than single flexure designs, this also allows cyclic testing at higher frequencies.
- Optional versions for use in vacuum environment.
- Special rods for large specimens.

Technical Data	Series 3580
EN ISO 9513 Accuracy Class	0.5
Measuring Range	± 0.5, ± 0.75, ± 1.5, ± 2 or ± 5 mm
Linearity Error incl. Hysteresis	< 0.15 mm
Operating Temperature	- 40 °C up to +1000°C
Dimensions Round Specimens	Ø 4.5 - 16 mm

Digital Video Extensometers
Series VEX

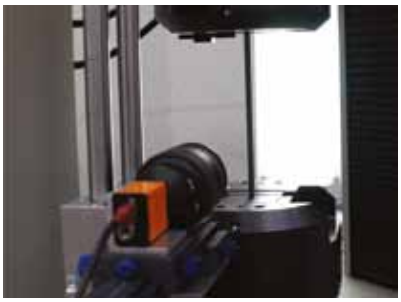
For the simultaneous measurement of longitudinal and transversal strain in tension e.g. tests or as high speed version with 4000 Hz (4 kHz) measuring range.

Specially suitable for measurements during dynamic tests, particularly on polymers and other materials with relatively large strain. The Series VEX Video Extensometers are contact-less optical measurement systems based on a single camera and real time image processing.

High Resolution Type VEX 50
for the simultaneous measurement of longitudinal and transversal strain in tension e.g. tests. It measures the strain between two applied lines with a rate of up to 50 Hz. The specimen's deformation is measured contact less and e.g. stress-strain curves, E-Modulus and Poisson's ratio are determined. The strain data is transferred to the digital controller for closed loop strain control or data acquisition.

High Speed Type VEX 4000
High speed version with 4000 Hz (4 kHz) measuring range. This unit is specially suitable for measurements during dynamic tests, particularly on polymers and other materials with relatively large strain.

Accessories
Sample marking machine, backlight, mounting bracket for testing machine and portable tripod.

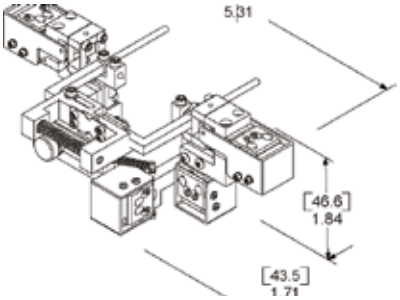


Technical Data	VEX 50	VEX 4000
EN ISO 9513 Accuracy Class	0.5	0.5
Strain Range max.	500%	500%
Strain Resolution	0.002 %	0.02 %
Measurement Rate max.	50 Hz	4000 Hz
Spatial Resolution of measuring field max.	$1x10^{-6}$	$1x10^{-6}$

Axial / Torsional Extensometer
Series 3550

For simultaneous measuring axial and torsional deflections on specimens tested in axial / torsional machines. All units are capable of bidirectional travel, so they may be used for cyclic testing under fully reversed loads.

The Model 3550 extensometer is most often used on round specimens tested in bi-axial test machines capable of simultaneous axial and torsional loading. The extensometer is often customized for particular applications. All units are capable of bi-directional displacement, so they may be used for cyclic testing under fully reversed loading conditions. The standard sized model is self-supporting on the specimen, and works on specimens from 9.5 to 25.4 mm. The included conical point contacts are made from tungsten carbide. Their unique design directly measures the surface shear strain angle, which allows operation on a wide range of specimen diameters without changing calibration. All models are designed specifically to minimize crosstalk between axes and to provide high accuracy measurements. A wide range of gauge length and measuring ranges are available. Because these transducers are often used for specialized tests, contact us with specific test needs.
Operating force < 30g typical.
Crosstalk <0.5%.



Technical Data	10-05-04	12-20-02	25-05-02	25-05-03	25-10-02
EN ISO 9513 Accuracy Class			0.5		
Axial Gauge Length	10 mm	12.5 mm	25 mm	25 mm	25 mm
Axial Measuring Range	±5%	±20%	±5%	±5%	±10%
Torsional Shear Strain Angle	±4°	±2°	±2°	±3°	±2°
Linearity Error incl. Hysteresis			<0.15		
Operating Temperature	-40°C up to +100°C or Option - 265 °C up to +175°C				
Dimensions Round Specimens	Ø 9.5 - 25.4 mm				

Crack Mouth Opening Extensometer

Series EXR

Used to determine material characteristics R-Value, J_{IC} and K_{IC}. Suitable for tensile, bending, and fracture mechanical tests on specimens, original component parts, and assemblies of any configuration.

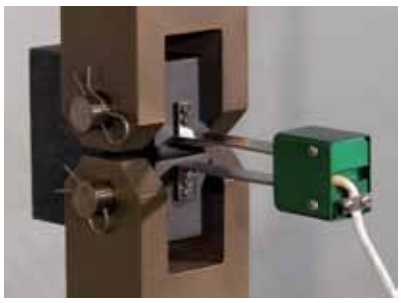
Crack mouth opening values are assigned via calibration curve, crack length values used to deter- mine material characteristics R-curve, JIC, and KIC. EXR - Extensometers are suitable for tensile, bending, and fracture mechanical tests on specimens, original component parts, and assemblies of any configuration.
It is ideally suited for J-integral tests with large gauge length and range of measuring displacement. Adjustment to the specimen is simple but precisely. The extensometer can be clip on to either knife edges screwed to specimen or to machined specimen edges.

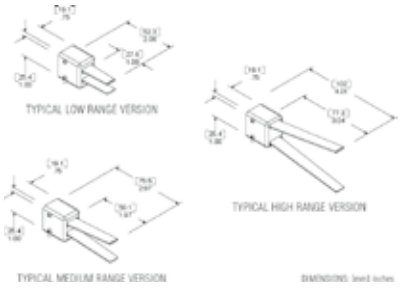
Technical Data	Series EXR
Standard Initial Gauge Length	5 - 30 mm (in steps of 5 mm)
Measuring Range	0.25 - 10 mm
Linearity Error incl. Hysteresis	0.25 - 0.3%

Fracture Mechanics Clip-On Gauges

Series 3541

For fracture toughness testing according to ASTM E1820 & ASTM E813. Used for a variety of fracture mechanics tests, including compact tension, arc shaped, disk shaped, bend specimens or other specimen geometries.





For fracture mechanics studies, these gauges are in compliance with standardized test methods, such as ASTM E1820 for determination of fracture toughness properties of metallic materials. These gages conform to the requirements of ASTM E399 for fracture toughness and E1820 and E813 for JIC and R-curve determination. In addition, the modified groove design complies with E1820 tests where greater stability and accuracy results from the sharper groove root. Clip-on gauges are used for a variety of fracture mechanics tests, including compact tension, arc shaped, disk shaped, bend specimens or other specimen geometries in compliance with ASTM and other standards organization's test methods. Clip-on gages can be used directly on test specimens where the knife edges are integral with the test specimen or, alternately, with optional bolt-on knife edges mounted on the test specimen.

Features

- Accuracy according to ASTM
- Fully enclosed gages to protect from accidental damage.
- Sharp grooves per ASTM E1820, E813, and E399 for improved stability when mounted.
- All capable of high frequency operation (50 Hz or faster, depending on version).

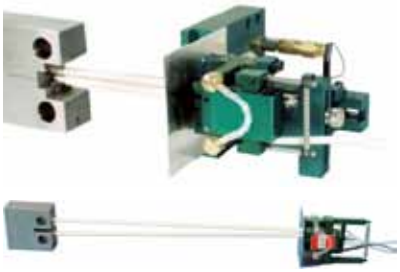
Technical Data	Series 3541
Standard Initial Gauge Length	3, 5, 8, 10, 12 or 20 mm
Measuring Range	+2.5/-1, +4/-1, +7/-1, +10/-1, +12/-2 mm
Linearity Error incl. Hysteresis	0.15 (for < 6 mm), 0.20 (rest)
Operating Temperature	-265°C up to +175°C

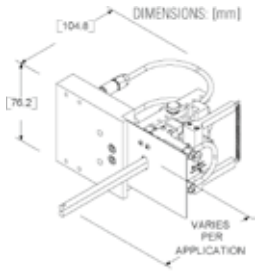
HT Fracture Mechanics Clip-On Gauges
Series 3548 COD

For fracture toughness testing according to ASTM E1820 and ASTM E813. For use in split type materials testing furnaces with a slot for the ceramic rods for temperatures up to 1200 °C, optional up to 1600°C.

Water-cooled and furnace bracket mounted, these are for use to 1200 °C . The high temperature option allows use to 1600 °C . These COD gages mount on a water-cooled bracket which is mounted on the furnace side cut-out or with optional load frame support brackets. The standard temperature version (to 1200 °C) is supplied with high purity alumina rods. The high temperature option is furnished with alpha grade silicon carbide rods. Rods are made to order to the length required for your furnace. Mounting brackets may be integrated with the furnace cut-out. w+b can also provide optional load frame mounting brackets to fit your test frame. Contact edges on the test sample should be somewhat rounded (not sharp knife edges) for best performance with this model.

Features
- Accuracy according to ASTM
- Rugged, dual flexure design for strength and improved performance.
- All units operate in tension and compression.
- Includes high quality foam lined case and a spare set of ceramic rods.
- Optional load frame mounting brackets





3548COD EXTENSOMETER

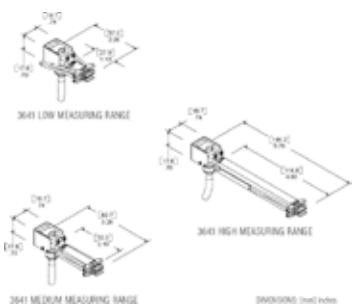
Technical Data	Series 3548 COD
Standard Initial Gauge Length	5, 8, 10, 12 or 20 mm
Measuring Range	±2.5, ±4, ±7, ±10 or ±12 mm
Linearity Error incl. Hysteresis	< 0.15%
Operating Temperature	Ambient up to 1200°C or up to 1600°C as Option

HT Un-Cooled Fracture Mechanics Gauges
Series 3641

HT clip-on gauges for fracture mechanics tests in environmental chambers where the entire gauge must be exposed to the heat. These capacitive sensor based clip-on gauges may be used up to 540°C without any cooling.

These gages are designed for testing at elevated temperatures, much higher than strain gage based clip-on designs. They can be used for several standardized fracture test methods, including ASTM E399 for fracture toughness or E1820 and E813 for J_{Ic} and R-curve determination. The Model 3641 uses a high temperature capacitive sensor and can operate without any cooling at the upper temperature limit of most environmental chambers used in materials testing. High temperature nickel alloy springs are used to create the force to hold the gage in place on the knife edge contacts. Stiff arms with a flexure design at the rear eliminates potential problems of high temperature creep experienced with other designs.

Features
- Accuracy according to ASTM requirements.
- Sharp grooves per ASTM E1820, E813, and E399 for improved stability when mounted.
- Rugged design provides dynamic testing capability to 20 Hz or faster depending on version.
- Recommended for elevated temperature testing in air or some other gases
- Operating force 9 - 14 N.



Technical Data	Series 3641
Standard Initial Gauge Length	3, 6, 10, 12 or 12.5 mm
Measuring Range	+3, +6, +10, +12 or +12.5 mm
Linearity Error incl. Hysteresis	< 0.10%
Operating Temperature	Ambient up to 540°C

Potential Drop Crack Growth Monitor
Series DMC

Microprocessor based instrument for measuring crack depth in metals undergoing materials testing. Uses the Pulsed Direct Current Potential Drop Method (DCPD) which is an established technique covered by ASTM 647.

The electric potential growth technique is non contaminating and can be used in most environments specially inside an environmental test chamber. Visual method generally are not practical, often, the crack and the test specimen are obscured by the test chamber or a microscope with a long facial length needed. The technique involves passing a constant current through the metal under test and measuring the resultant voltage drop that is created across the specimen. The presence of a growing defect will alter this voltage and by suitable calibration, a measure of the defect depth can be obtained.

Features

- Capable of reverse and pulsed DCPD.
- Advanced filtering and sampling, triggering including peak, trough, and midpoint of load cycle waveform input.
- Variable DC offsets for the removal of standing voltage.
- Two channels as standard, reference and specimen.