

Technical data

Short measuring range / DMS	MFN-A and MFN-C
Accuracy class EN ISO 9513	0.2
Measurement principle	full bridge strain gauge
Travel	4 mm
Activating force	80 cN
Indication error (v. A.)*	0.20 %
Error in linearity	0.06 %
Indication error*	± 0.6 µm
Standard gauge length	50 mm
Special Accessories for gauge lengths	10, 15, 20, 25, 30, 40, 50, 60, 70, 80, 90, 100, (200) mm
Error in gauge length	50 µm
Rated resistance of the bridge	350 Ohm
Sensitivity	2 mV/V
Recommended voltage supply	1-6 V / 5 kHz
Maximum sample thickness	30 mm
Maximum sample width	70 mm
Maximum sample diameter	30 mm
Other dimensions	on inquiry

*The larger value is admissible.

Device options

Measuring direction downwards
Longer measuring arms +75 mm
Longer measuring arms +125 mm
Measuring arms with tilting mechanism for tungsten carbide knife edge Ø12mm
Measuring arms with tilting mechanism for tungsten carbide knife edge circular/straight
Lengthening for knife edge +10mm
MFN transposable opening width of measuring arms Ø0-30mm and Ø30-60mm
Assembly plate for MFN

Long measuring range / analog	MFN-A and MFN-B
Accuracy class for a path > 4 mm	1
Measurement principle	potentiometric
Travel Standard	500 mm
Long travel	800 mm
Activating force	20 cN
Indication error (v. A.) for a path > 4 mm*	1 %
Error in linearity	0.025 %
Indication error*	40 µm
Standard gauge lengths	10 to 100 mm in steps of 5 mm
Optional Gauge length	up to 200 mm
Error in gauge length	50 µm
Output voltage range	0...+10 V or +10...-10 V
Required voltage supply	+24 V stabilized max. 50 mA
Maximum sample thickness	30 mm
Maximum sample width	70 mm
Maximum sample diameter	30 mm
Other dimensions	on inquiry
Weight	approx. 19 kg

MFN

Long travel extensometer - semi automatic -
Dual range measurement



M e s s - & F e i n w e r k t e c h n i k G m b H



P r e c i s i o n t e s t i n g o f l i n e a r s t r a i n

Area of application

The Long travel extensometer MFN is used at semi and full automatic tensile testing machines, particularly if the gauge length L_e does not have to be changed very often.

The extensometer MFN is available in 10 models in a modular design.

Therefore the most suitable model can be chosen for each application.

The **MFN-A** offers both a small and a large measuring range.

With the smaller range (4 mm) highest measurement accuracy is achieved.

All requirements of the European Standard EN ISO 9513 are exceeded.

The MFN-A is highly suitable for determining the Young's Modulus and for recording fracture elongation of $L_e + \Delta L = 800$ mm.

The **MFN-B** offers only the large measuring range. It serves in measuring of large sample extensions as observed in elastomers.

The **MFN-C** includes only the small measuring range (4 mm). The large guided length of 500 mm just serves to move the arms with respect to the sample centre as also to adjust them for different clamping heights.

Design and function

The guide carriages are parallel and without play waged. No error arises thru angle change of the measuring arms like in simple systems with rotating measuring arms.

An easily movable parallel swing plate compensates alignment errors and slanting pull between the machine and the MFN. It is mounted to the base of the MFN and no force is transferred on to the sample.

Short measuring range

A measuring spring bonded with a full bridge strain gauge is housed in the upper right measuring arm. Its deflection results from the measuring pin of the lower arm. A close positioning of the measuring system to the sample makes measurement accuracy possible which is otherwise only achievable through hand-clamped extensometers directly attached to the sample. Measuring pins required for different L_e may be changed easily and quickly (standard accessory is a 50 mm pin).

Long measuring range 500/800mm analog

The large measuring range of the MFN is instrumented with a 5kOhm measuring potentiometer.

With a built in measuring amplifier the difference of the wiper potentials will be converted in an output voltage of +10V...-10V and 0V...+10V.

The user must provide a stabilized supply voltage of +24 VDC (respectively max. 20mA).

Manual and automatic operation

In the **manual version** of the MFN the measuring arms must be opened, closed and pushed to the L_e -stop by hand. The L_e -stop snaps in the L_e -range 10 to 100 mm in 5 mm-steps.

MFN-A / MFN-C:

At MFN-A and -C Version the L_e -Stop is ensued by the measuring pin, therefore the engage-measuring stick must be snapped in at L_e 10mm. The engage-measuring stick (MFN-A) comes only in use if the short measuring range is not in application and the measuring pin is not in use too.

MFN-B

The L_e -Stop is ensued by the engage-measuring stick. It snaps in a range of 10 till 100mm in steps of 5mm (optional till 200mm).

In the automatic version the MFN works semi-automatically, the

positioning of the measuring arms at the middle of the sample and the setting gauge length must be adjusted by hand (once before starting the test).

The L_e -Stop is in every case the engage-stick. By using the measuring pin the corresponding L_e -value must be adjusted at the engage stick. Between measuring pin and strain gauge sensor housing of the upper measuring arm must be always a minimum air gap.

The opening and closing of the measuring arms and the moving of the before adjusted position (middle of sample) runs automatically. A start or stop of measurement can be done by pushing the keys at the MFN-control electronics or can be realized over X1 connector via computer.

In the **automatic version** the MFN works semi-automatically, the positioning of the measuring arms at the middle of the sample and the setting gauge length must be adjusted by hand, but the opening and closing of the measuring arms and the moving of the before adjusted position (middle of sample) runs automatically. As long as the initial gauge length and the position of the sample stay unchanged, no manual adjustment is necessary. With a change of the gauge length an engagement is needed.



Picture 1: Measuring arms MFN - A automatic



Report for the extensometer test according to DIN EN ISO 9513 (Manufacturer's report)

MF GmbH

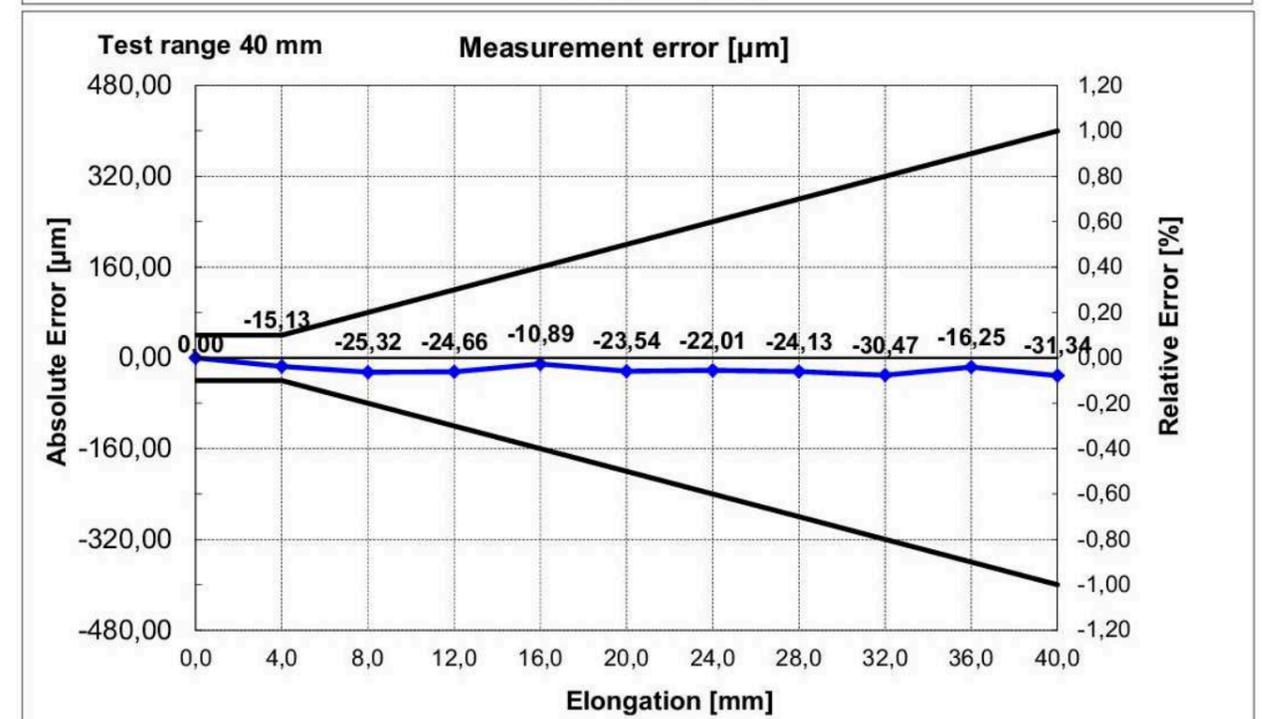
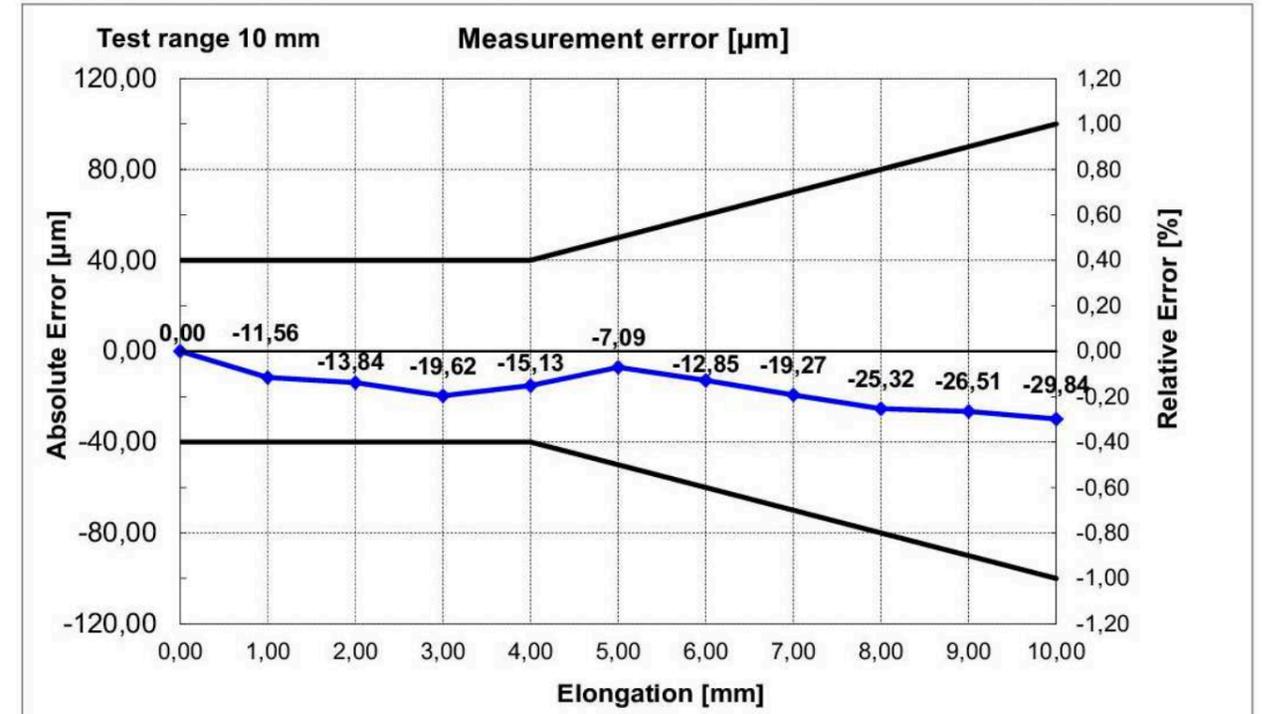
Issued by: Wiedemann

Konrad-Zuse-Str. 4 D-42551 Velbert

Date: 18.12.2014

Extensometer: MFN-A No. 14366
Nominal length: 500 mm
Measurement Unit: F8845A No. 1147012

Initial length: 50 mm
Resolution: 0,1 µm
Protocol No. 14366-1E



Achived accuracy class:	1	ab 4 mm Messweg
Absolute Error [µm]*:	+/- 40	
Relative Error [%]*:	+/- 1	* Higher value is allowed
Calibration Unit:	KMF100 No. 9104	Resolution: 0,01 µm
with Position Display:	ND281-B No. 105 46 218	Measurement error: +/- 0,67 µm*
Measurement Method:	MF	Measurement error (rel.): +/- 0,2 %*

Picture 4: Example specific test report / Long measuring range



Report for the extensometer test
according to DIN EN ISO 9513 (Manufacturer's report)

MF GmbH

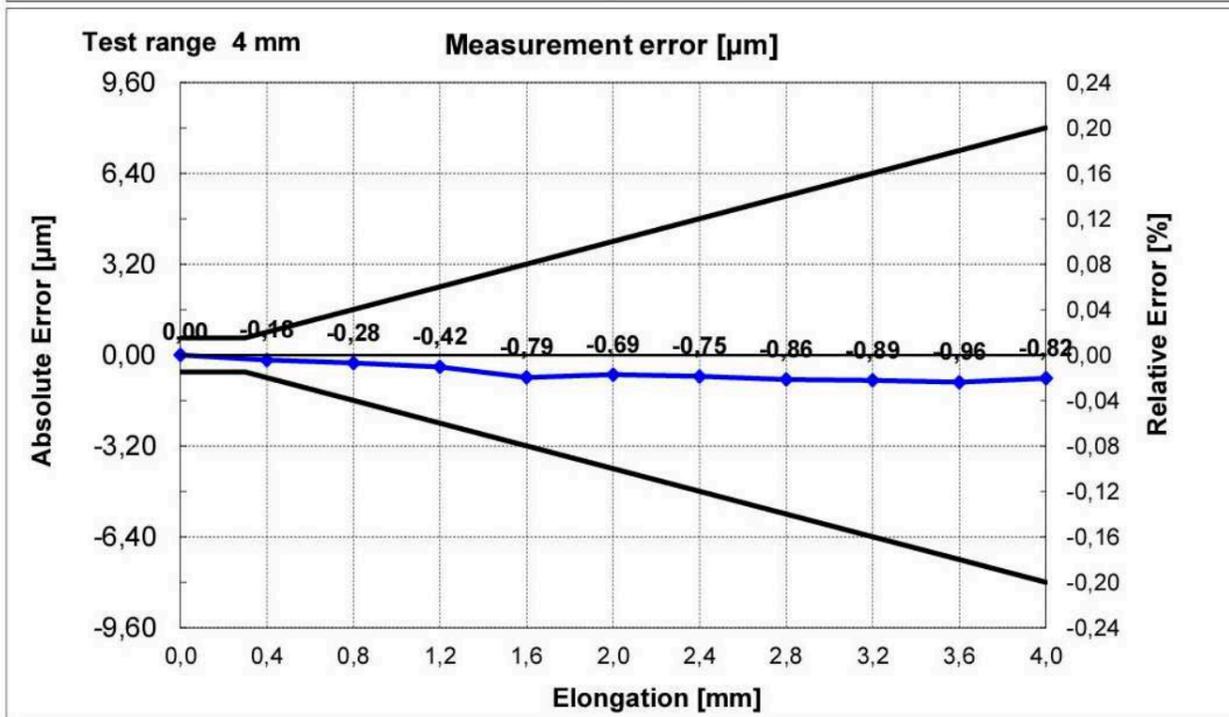
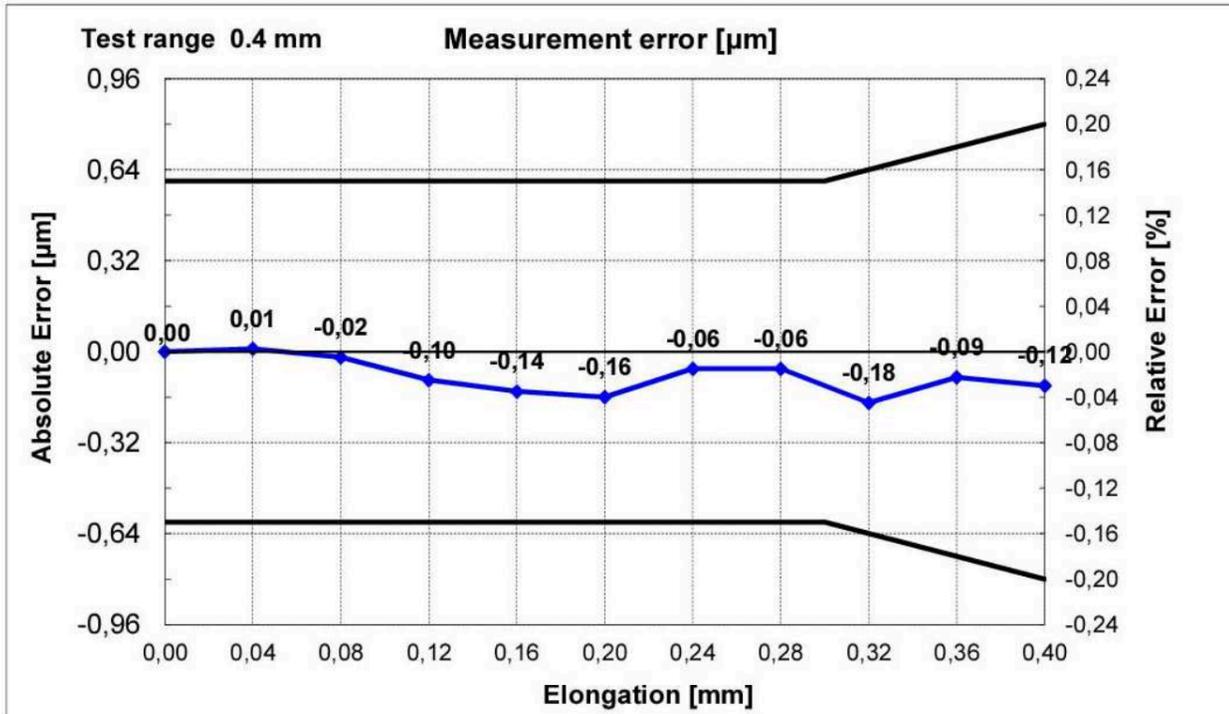
Issued by: Klem

Konrad-Zuse-Str. 4 D-42551 Velbert

Date: 18.12.2014

Extensometer: MFN-A No. 14366/14402
Nominal length: 500 mm
Measurement Unit: DK38 No. 180

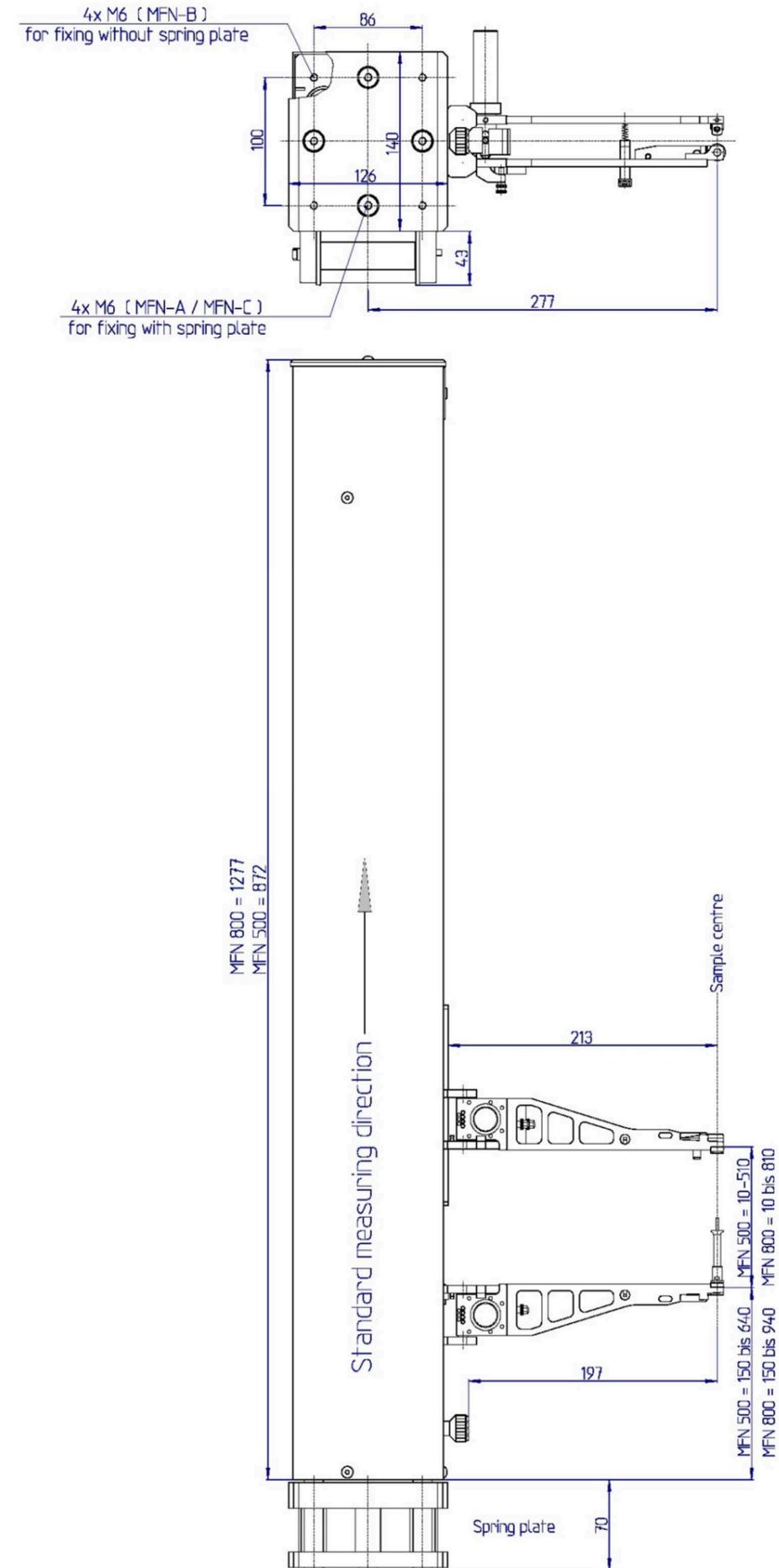
Initial length: 50 mm
Resolution: 0.1 μm
Protocol No. 14366-2E



Achieved accuracy class: 0.2
 Absolute Error [μm]*: +/- 0.6
 Relative Error [%]*: +/- 0.2
 * Higher value is allowed

Calibration Unit: KMF100 No. 9104 Resolution: 0.01 μm
 with Position Display: ND281-B No. 105 46 218 Measurement error: +/- 0.2 μm *
 Measurement Method: MF Measurement error (rel.): +/- 0.06 %*

Picture 3: Example specific test report / Short measuring range

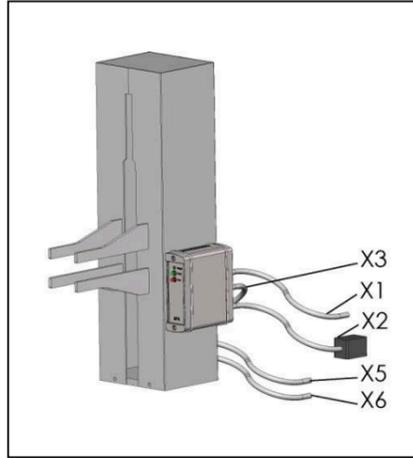
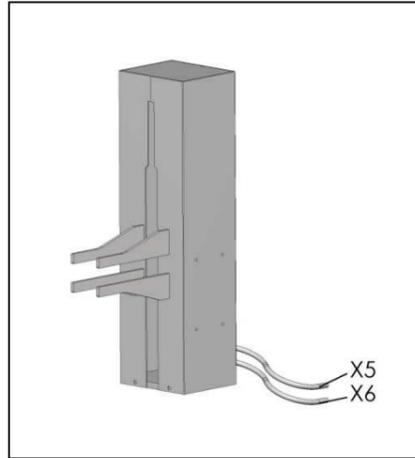


Picture 2: MFN - Dimension

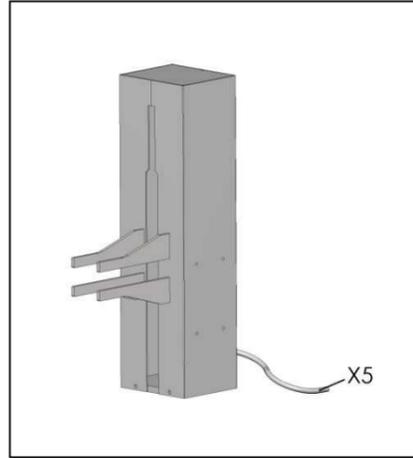
MFN-Product range

MFN-A

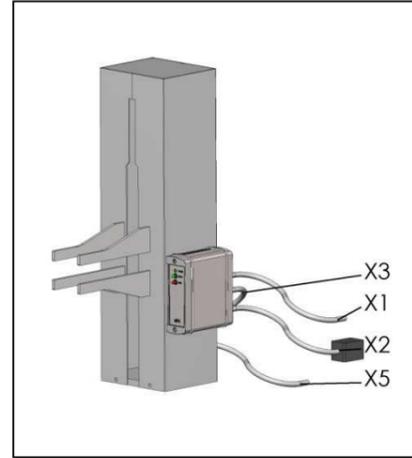
Dual range extensometer



MFN-B

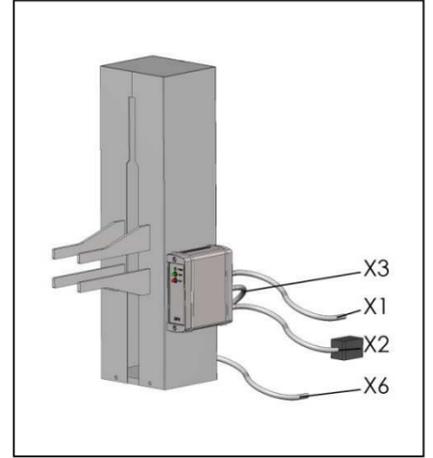
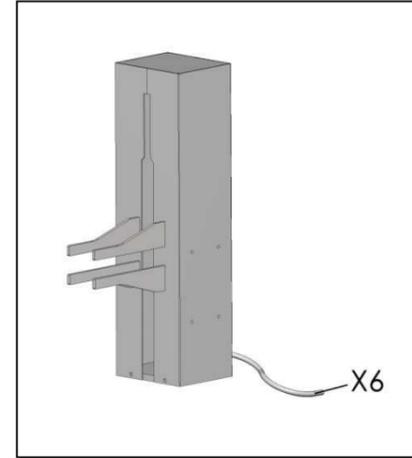


Extensometer for long path



MFN-C

Extensometer for short path



MFN-A-500-4 manual

Long measuring range 500 mm
Short measuring range 4 mm
Art. No.: E 07 100

MFN-A-500-4 automatic

Long measuring range 500 mm
Short measuring range 4 mm
Art. No.: E 07 103

MFN-B-500 manual

Long measuring range 500 mm
Art. No.: E 07 106

MFN-B-500 automatic

Long measuring range 500 mm
Art. No.: E 07 109

MFN-C-4 manual

Positioning length 500 mm
Short measuring range 4 mm
Art. No.: E 07 112

MFN-C-4 automatic

Positioning length 500 mm
Short measuring range 4 mm
Art. No.: E 07 113

MFN-A-800-4 manual

Long measuring range 800 mm
Short measuring range 4 mm
Art. No.: E 07 102

MFN-A-800-4 automatic

Long measuring range 800 mm
Short measuring range 4 mm
Art. No.: E 07 105

MFN-B-800 manual

Long measuring range 800 mm
Art. No.: E 07 108

MFN-B-800 automatic

Long measuring range 500 mm
Art. No.: E 07 111

Supplied parts

MFN-A

1 Measuring pin L _e 50 mm
1 Spanner 5.5 / 7 mm
1 Screw driver TORX T10
1 Gauge discs 4 mm
1 Gauge rod for large travel
1 Connector for cable X5
1 Connector for cable X6 /DMS
1 Hook
1 Hexagon key 2.5 mm
1 Parallel spring plate

MFN-A automatic

1 Measuring pin L _e 50 mm
1 Spanner 5.5 / 7 mm
1 Screw driver TORX T10
1 Gauge discs 4 mm
1 Gauge rod for large travel
1 Connector for cable X1
1 Connector for cable X5
1 Connector for cable X6 / DMS
1 Cable X3 / 0.3 m
1 Controller with power supply / X2
1 Hook
1 Hexagon key 2.5 mm
1 Parallel spring plate

MFN-B

1 Spanner 5.5 / 7 mm
1 Screw driver TORX T10
1 Gauge rod for large travel
1 Connector for cable X5
1 Hook
1 Hexagon key 2.5 mm

MFN-B automatic

1 Spanner 5.5 / 7 mm
1 Screw driver TORX T10
1 Gauge rod for large travel
1 Connector for cable X1
1 Connector for cable X5
1 Cable X3 / 0.3 m
1 Controller with power supply / X2
1 Hook
1 Hexagon key 2.5 mm

MFN-C

1 Measuring pin L _e 50 mm
1 Spanner 5.5 / 7 mm
1 Screw driver TORX T10
1 Gauge discs 4 mm
1 Connector for cable X6 /DMS
1 Hook
1 Hexagon key 2.5 mm
1 Parallel spring plate

MFN-C automatic

1 Measuring pin L _e 50 mm
1 Spanner 5.5 / 7 mm
1 Screw driver TORX T10
1 Gauge discs 4 mm
1 Connector for cable X1
1 Connector for cable X6 /DMS
1 Cable X3 / 0.3 m
1 Controller with power supply/ X2
1 Hook
1 Hexagon key 2.5 mm
1 Parallel spring plate

Connections

X1Cable.....MFN controlRemote control	
X2Power supplyMFN control24 VDC / 2 A
X3Cable.....MFN controlMFN 0.3 m	
X5Cable.....MFN potentiometer electronic 0...10V / +10...-10VMeasurement signal evaluation	
X6Cable.....MFN strain gaugeMeasurement signal evaluation	

Spare parts and accessories

MFN-A measuring pins L_e 10 to 100 (200) mm not adjustable
 POM slide thrust piece
 HSS-knife edge Ø 13 mm for MFN-A (strain gauge side)
 HSS-knife edge Ø 9.5 mm für MFN-B
 Fastening screw for knife edge T10 M3