

**MF**

## LONGITUDINAL EXTENSOMETERS "Clip-On" Models MFA 25/12/8

These Extensometers have a multiple application for **metal and plastic specimens**. Especially the low tension causes only a small force on the specimens.

Its measurement accuracy meets the requirements of EN ISO 9513, class 0.5.

## APPLICABLE STANDARDS EN ISO 9513.

### AREA OF APPLICATION

The MFA 25 linear strain gauge is suitable for many test pieces above an initial instrument measuring length of  $L_0$  of 25 mm (by 180°-turning of the measuring blades even above  $L_0 = 20$  mm). At a measuring path of 25 mm the MFA 25 finds multiple application **for metal and plastic** test pieces. Especially the low tension causes only a little force on the test pieces. Its measuring accuracy complies with the requirements of the standard EN ISO 9513, class 0.5.

### DISEÑO Y FUNCION

The measuring arms are made of a high strength aluminum 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 many 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. The measuring spring is absolutely protected by means of stops against any excess in the measuring path or the breaking of test pieces while the MFA 25 is in operation. Two tried and tested clamping devices of MINI MFA 2 facilitate a quick and precise clamping of the instrument onto the test pieces. 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 measuring instrument provides a suspending point for the compensation of weight for specially not sensitive test pieces.

The **L<sub>0</sub>** of the equipment can be extended to 30, 50, 80 and 100 mm.

The blades and the clamping devices are attached to a common carrier so that they can be exchanged simultaneously.

On the measuring spring, there is an application of a temperature compensated DMS-full bridge which is calibrated to 2 mV/V for the nominal measuring path. The round measuring blades can be used along their entire circumference via rotation thus enabling an even longer period of use.

### TEMPERATURE CHAMBER

A special model of the MFA can be supplied for tests in the temperature range of + 1 °C to + 200 (260) °C.

### OPERATION

To operate the MFA 25 the clamping devices positioned opposite each other are opened simultaneously with the thumb and forefinger to enable an easy placement of the MFA 25 on test pieces at inclined positions. In cases of large cross-sections of test pieces and small  $L_0$  where a diagonal clamping is not possible a replacement of the lower clamping device is possible. This enables both clamping devices to be on one side. No unlocking or adjustments must be made on the MFA 25. The device is that stable that the  $L_0$  is perfectly correct with closed measuring arms.



### CALIBRATION

The calibration points of the MFA 25 are defined by its stops. The test value of the uppermost stop is already measured in the factory and is mentioned precisely for each instrument in the enclosed brochure. This enables a simple calibration of sensitivity.

1. Bring the device into the required position (measuring arms closed) and adjust the amplifier to zero.
2. Hold the device on the upper measuring arm in horizontal position so that the lower measuring arm falls against its stop.
3. The measuring amplifier is now to be adjusted to the value given in the brochure.

For example:

Actual path (value in the brochure) 25.48 mm = 10.192 V

This corresponds to 10.00 V for a nominal path of 25.00 mm.

4. Repeat steps 1 to 3 and readjust if necessary.



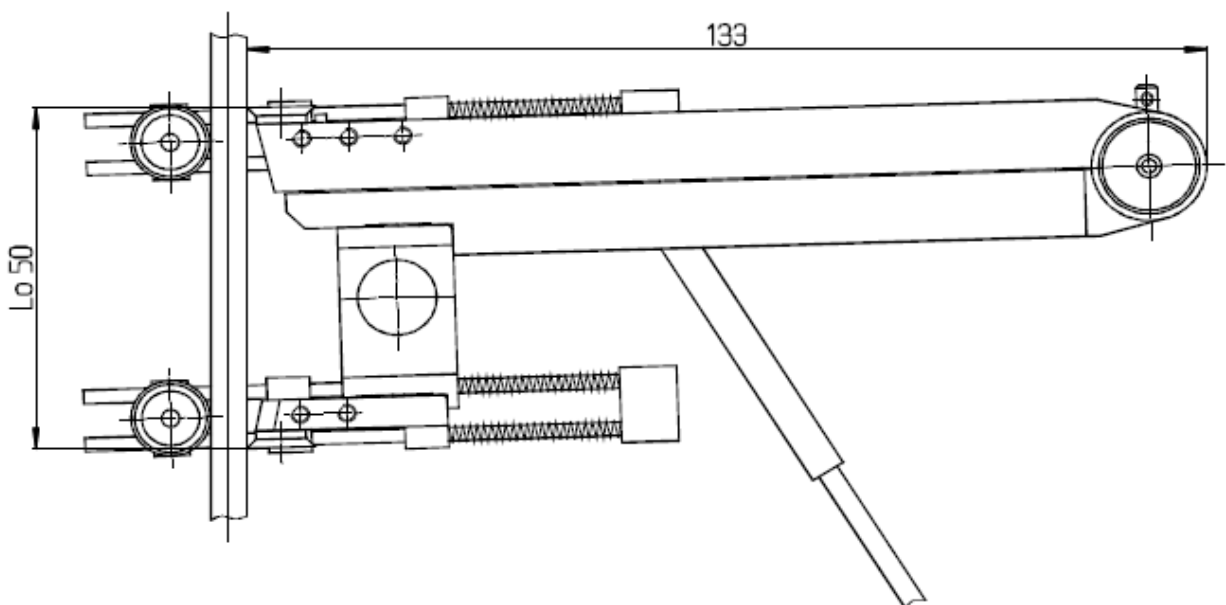
### RECOMMENDATION

In case of high standard requirements on calibration the following calibration equipment is suitable:

- KMF 3 for calibration of sensitivity.
- KMF 01 for calibration of sensitivity and for checking the linearity for measuring Instruments as per EN ISO 9513 class 0.2 and ASTM class A.

### Double side MFA25

Two MFA 25 can be used with a double clamping device to average the strain of a sample.



**Picture 1: MFA 25/12 standard with Lo 50mm**

### Spares parts and accessories

- \* Extension arm for Lo 30 mm  
Lo 50 mm  
Lo 80 mm  
Lo 100 mm
- \* Round measuring blade Ø 9.5 mm
- \* Rectangular measuring blade  
9.5 x 10 mm
- \* Adapters for test pieces of cross-section up to a max.  
of 50 mm in diameter and 50 x 50 mm flat
- \* Screw for fixing the blades M3 x 8 T10
- \* Screw for fixing the clamps M2.5 x 6 T8
- \* Clamping device for double-sided MFA25

### MFA 8 Class 0.2

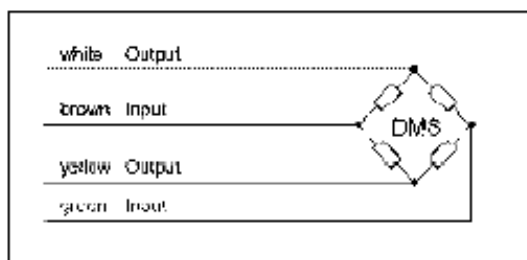
The non-linearity (< 0.5 % V.A) of the MFA 25 comes from its axis suspension and its long measuring path of 25 mm.

A model in class 0.2 EN ISO 9513 (ASTM class A) can be supplied for a measuring path of 8 mm and greatest precision in linearity.

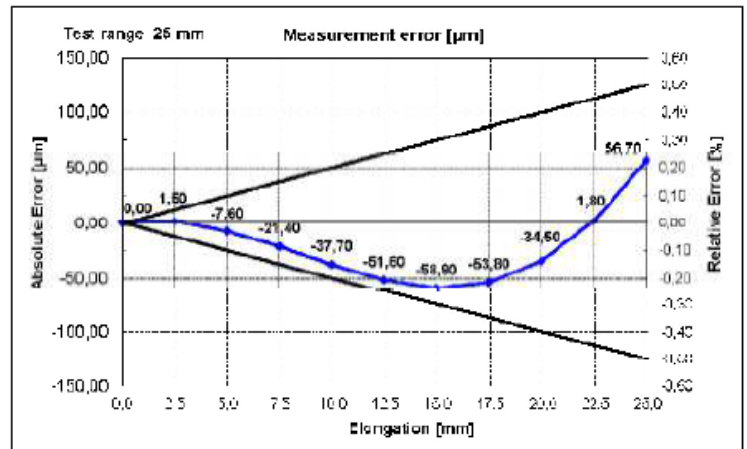
This instrument is called MFA 8. The MFA 8 differs from the MFA 25 in its technical data (please see the reverse side).

### Delivery Scope

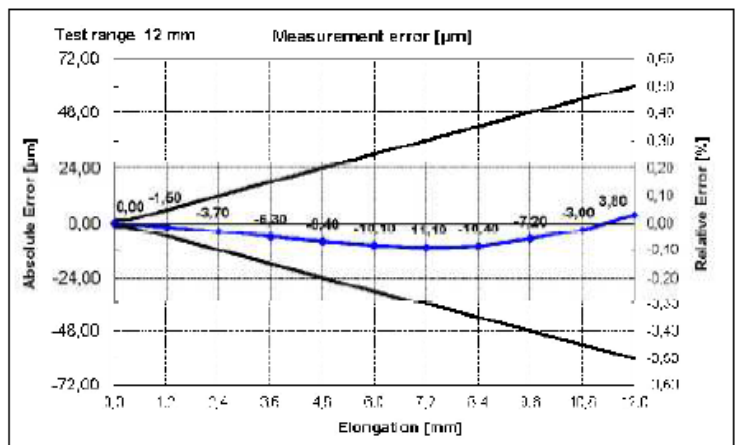
- ✓ 1 MFA 25/12/8 with 5 m cable
- ✓ 1 Extension arm Lo 50 mm
- ✓ 2 Clamping devices with one counter roller
- ✓ 2 pcs. spare screws M2. 5 and 2 pcs. M3
- ✓ 1 Screwdriver TORX T8
- ✓ 1 Screwdriver TORX T10
- ✓ 1 Test report
- ✓ 1 Storage case



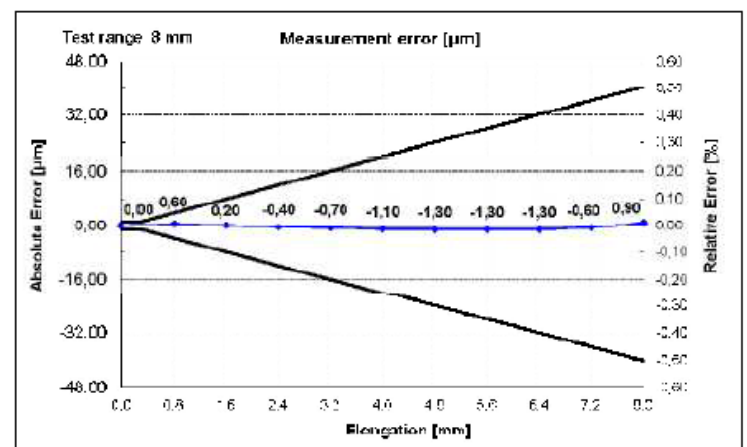
Picture 5: Wiring



Picture 2: Linearity diagrams MFA 25



Picture 3: Linearity diagrams MFA 12



Picture 4: Linearity diagrams MFA 8

Technical data	MFA 25	MFA 12	MFA 8
Accuracy class EN ISO 9513	0.5	0.5	0.2
Measurement principle	Full bridge strain gauge	Full bridge strain gauge	Full bridge strain gauge
Range in tensile direction	25 mm	12 mm	8 mm
Linearity error incl. hysteresis	0.25 %	0.25 %	0.1 %
Indication error (rel.)*	0.5 %	0,5 %	0.2 %
Indication error*	1.5 $\mu$ m	1.5 $\mu$ m	0.6 $\mu$ m
Accuracy in repetition	0.1 %	0.1 %	0.1 %
Error in initial gauge length	50 $\mu$ m	50 $\mu$ m	50 $\mu$ m
Sensitivity	2 mV/V	2 mV/V	2 mV/V
Rated resistance of the bridge	350 $\Omega$	350 $\Omega$	350 $\Omega$
Max. voltage input	14 V	14 V	14 V
Activating force	> 10 cN	> 10 cN	> 10 cN
Standard initial gauge length	25 & 50mm (20 mm)	25 & 50mm (20 mm)	2 5&8 0mm (20 mm)
Accessories for initial gauge lengths	30, 80 and 100 mm	30, 80 and 100 mm	30, 80 and 100 mm
Other initial gauge lengths	on request	on request	on request
Standard temperature range	+1 $^{\circ}$ C to + 60 $^{\circ}$ C	+1 $^{\circ}$ C to + 60 $^{\circ}$ C	+1 $^{\circ}$ C to + 60 $^{\circ}$ C
Type for temperature chamber	+1 $^{\circ}$ C to + 200 (260) $^{\circ}$ C	+1 $^{\circ}$ C to + 200 (260) $^{\circ}$ C	+1 $^{\circ}$ C to + 200 (260) $^{\circ}$ C
Size with L0 25 (H x W x L)	27 x 50 x 140 mm	27 x 50 x 140 mm	27 x 50 x 140 mm
Size with L0 50 (H x W x L)	52 x 50 x 140 mm	52 x 50 x 140 mm	52 x 50 x 140 mm
Weight approx.	95 g	95 g	95 g

\* The larger value is admissible

#### Adjustable for following test pieces' cross sections:

- ✓ Circular 0 to 28 mm diameter
- ✓ Flat up to 28 mm thickness
- ✓ up to 30 mm width
- ✓ Circular with adapter up to 50 mm diameter
- ✓ Flat with adapter up to 50 x 50 mm
- ✓ Cable length 5 m



**Example for Calculations of values "n" and "r",** in this image are combined the 2 Extensometers:

- **MFA - 25** Longitudinal
- **MFQ - R** Transversal