

Technical data	MFD
Accuracy class EN ISO 9513	0.5
Measuring principle	Strain gauge full bridge
Total travel	3 mm
Travel position	-2.5 ...+ 0.5
Linearity error including hysteresis	0.05 %
Indication error (of reading)*	0.20 %
Indication error *	± 1.5 µm
Error in initial measuring instrument length	< 50 µm
Sensitivity	2 mV/V
Rated resistance of bridge	350 Ohm
Actuation force	10 - 60 cN
Initial instrument measuring length	from 50 to 300 mm on inquiry
Temperature range	+ 1° C to + 40° C
Weight of the extensometer system MFD 3 with tension springs	400 g

\* The larger value is admissible

adjustable for the following sample cross-sections\*\*:

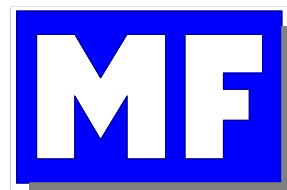
circular	160 mm +/- 10 mm
Cable length	5 m

\*\* For other diameters separate tension springs with their quick fasteners have to be ordered



# MFD

Measured value acquisition at compression direction



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 extensometer system MFD is suitable to determine the strength of pressure (ASTM D-2938) or the modulus of elasticity respectively (ASTM D-3148) of concrete cylinders or rectangular prism under longitudinal compressive stress. The application is carried out with two, three (as shown on the picture on the front page) or four gauge lines. For the automatic evaluation of the mean values the gauge lines are shunted parallel.

## Design and function

Two tension springs with quick fasteners allow easy and fast clamping of the extensometers to the sample. The tension springs are designed so that the extensometers are arranged symmetrically around the cylindrical sample.

## Measuring principle

The extensometer system MFD is equipped with a strain gauge full bridge. The resistance of the bridge is 350  $\Omega$ , the sensitivity 2 mV/V (in relation to a stroke of 3 mm). For evaluation of the mean values the gauge lines may be shunted parallel by means of a socket block (Optional accessory, not in the standard delivery).

## Operation

First of all both tension springs "A" have to be wound around the sample and joined by means of the quick fasteners. The tension springs have to be arranged symmetrically to the ends of the sample and the distance to each other has to correspond to the initial gauge length of the MFD. Moreover for clipping on the MFD the angle pieces "B" have to fit one on the top of the other.

Note: If the measurement is done together with the circumference extensometer MFU 4 (picture 1) this one has to be installed now (therefore please have a look into the separate manual of the MFU 4).

The extensometers of the system MFD now have to be put one after the other into the angle pieces "B" of the tension springs (picture 2). The extensometers moreover have to be aligned parallel to the axis and symmetrical to the circumference.

The knurled screws "C" absolutely have to be screwed in to their stops so that the measuring levers "D" lie on them.

As control the three single extensometers with the upper knife edge are pulled away a bit from the sample and after this are put back again. This guarantees a proper setting of the gauge length and prevents the measuring levers from touching their upper stops.

After these alignments the knurled screws "C" have to be screwed back to their stops to release the levers for the measuring stroke. At the same



Picture 1: Extensometer system MFD 3 with MFU 4 for measuring circumferences  
Smallest initial gauge length of MFD 3 combination with MFU 4 = 60 mm

## Alignment

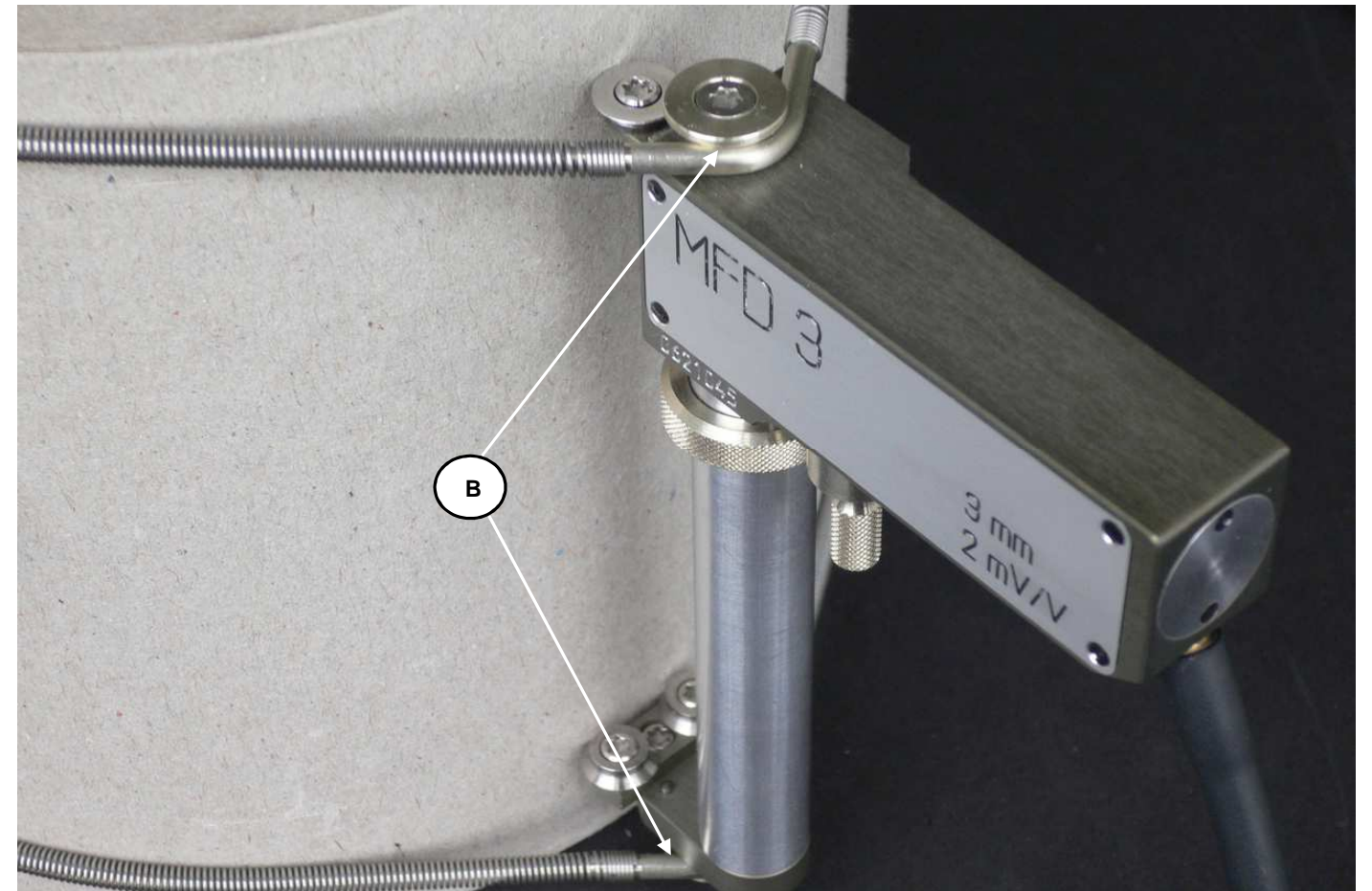
1. Screw the knurled screw in (zero point).
2. Bring unclamped MFD in measuring position and adjust the amplifier to "Zero".
3. Turn the knurled screw out till the whole measuring travel free is.
4. Push movable knife edge gentle downwards to its lower stop.
5. Adjust measuring amplifier in this position to the value which is documented in the test specification sheet
6. To make sure that the alignment has been carried out correctly, repeat steps 2 to 6 and readjust if necessary.

With that the alignment of the MFD is brought to its end.

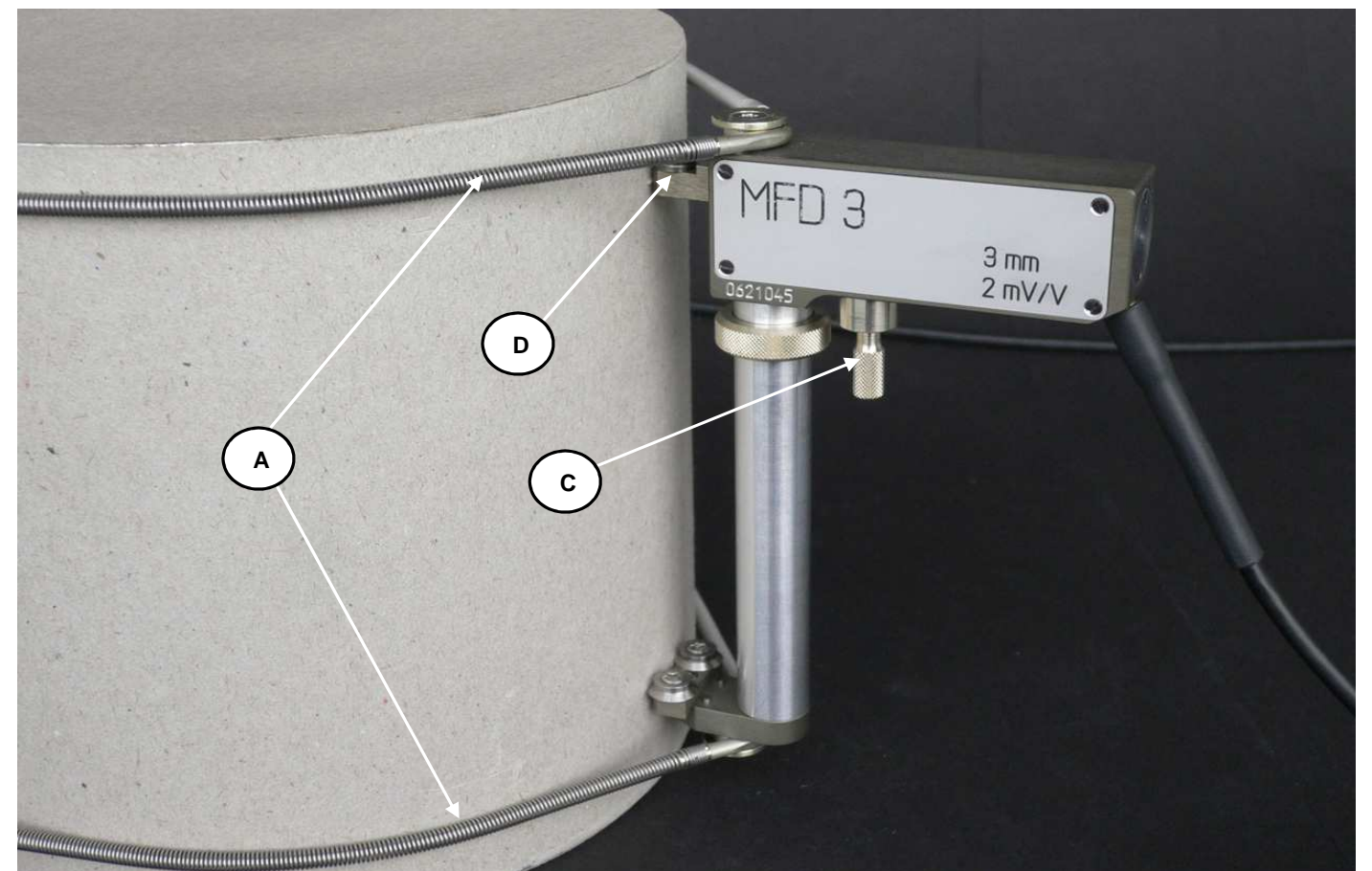
time the extensometers must not change their position on the sample. Finally the measurement can be started.

## Delivery scope

Extensometer system MFD
Gauge length extensions
Tension springs
Screw driver Torx T10
Linearity charts



Picture 2: Position of angle piece on the extensometer



Picture 3: Extensometer with clipped-on tension springs and gauge length stop ( $L_e$ )