| Technical Data | MFU 4 |
|---|---|
| Measuring principle | Strain gauge full bridge 350 Ω |
| Sensitivity | 2 mV/V |
| Stroke | 4 mm |
| Indication error (rel.)* | 0.5 % |
| Indication error (abs.)* | ± 1.5 µm |
| Weight | approx. 0.4 kg for sample diameter of 160 mm |

* The larger value is admissible

| Dimensions | |
|---|---|
| Sample diameter | 160 mm ± 2 mm |
| Chain length | 504 mm |

Other chain lengths for other sample diameters are available on request


# MFU 4

## Circumferential extensometer for concrete compression testing

Mess- & Feinwerktechnik GmbH

Precision testing of linear strain



Review 2023.04.

## Area of application

The MFU 4 is suitable for measuring the static modulus of elasticity and poisson's ratio of concrete in compression in accordance with the standard ASTM C-469.

## Design and function

The MFU 4 essentially consists of a roller chain with a fastener as well as an extensometer which is clipped on to the chain for the evaluation of the strain.

## Measuring principle

The MFU 4 is equipped with a strain gauge full bridge. The resistance of the bridge is 350 Ω, the sensitivity 2 mV/V (in relation to a stroke of 4 mm).

## Calibration

The MFU 4 is calibrated to 2 mV/V in relation to its stroke of 4 mm. A linearity check or a recalibration respectively is possible only with a specially designed calibrator. For making the settings for the sensitivity of the amplifier which is described later on a special calibration device is included in the delivery scope of the MFU 4 (Picture 8). It consists of a holder in which 3 measuring pins are fixed. The gap between the middle pin and the outer pins is exactly 14 mm or 18 mm respectively. The difference of 4 mm corresponds to the measuring stroke of the MFU 4. Now the MFU 4 has to be clamped with its three clamping pins "E" alternately between the pins of the clamping device. Therefore the extensometer has to be compressed and the position plate "C" has to be set so that the three clamping pins "E" of the MFU 4 can be put with soft play between the pins with the smaller distance. Now the amplifier has to be set to "zero". After this the MFU 4 is put between the pins with the greater gap (18 mm) and the amplifier has to be set to its end value. Possibly the whole calibration must be repeated for comprehensible readings. Thereafter the sensitivity's setting is completed. The position of plate "C" has no influence on this setting. If the position of plate "C" is changed for clamping the MFU 4 into the roller chain the sensitivity has not to be set again.

## Change of roller chain's length

The roller chain can be lengthened or shortened respectively by adding / removing chain links (max± 2). Therefore it can be adapted for samples of different diameters. The lengthening/shortening per chain link is 9 mm which is equivalent to a diameter change of 2.87 mm. It is only allowed to change the chain's length on that end of the chain "G" which is opposite to the tension device of the roller chain. Therefore one of the locking rings of the last roller has to be removed so that the bolt can be pushed out. Finally the end piece of the roller chain has to be installed back in opposite manner. Attention has to be paid to the right position of the grooves for the rods of the tension device.

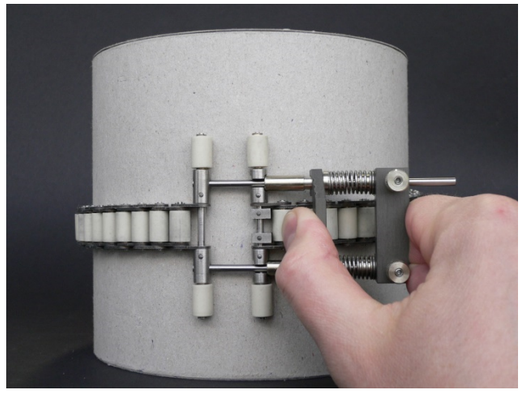
## Operation

In the first place the roller chain has to be wound around the sample and joined by means of the tension device (Picture 1). Therefore the tension device has to be opened with the thumb and forefinger and hung into the end of the roller chain (Picture 2). A too small opening width of the tension device can be increased by loosening the knurled screws "A" of clamping piece "B" (Picture 3). The opening width of the compressed tension device should be approx. 5 mm greater than it is necessary to hang it into the end of the roller chain.
The whole chain now has to be aligned and centred about midheight of the specimen (Picture 4). For the alignment it is helpful to roll the chain on the sample a bit into both directions.
After this the installation of the roller chain is completed and the extensometer itself can be clipped between the ends of the roller chain (Picture 5). Therefore the extensometer is compressed and hold to its stop. The plate "C" has to be set (after loosening the knurled screw "D") in that way that the extensometer with its three clamping pins "E" can be put into the gap between the bolts "F" of the roller chain. The plate "C" then has to be fixed in this position by fastening the knurled screw "D" (Picture 6).
The setting has to be checked again: the play between the bolts "F" of the roller chain and the clamping pins "E" of the extensometer should be max. 0.5 mm.

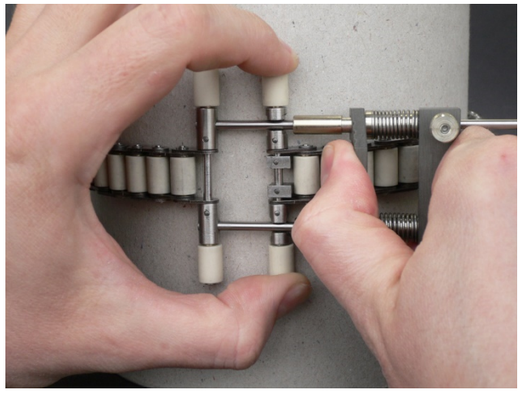
Note: while the extensometer is clamped into the roller chain it has to be compressed against its spring tension (Picture 7) to its stop. By its spring tension the extensometer clamps itself automatically and aligns itself by its three separate clamping pins "E" without play on the pins "F" of the roller chain.
Now the measurement can be started.

## Delivery scope

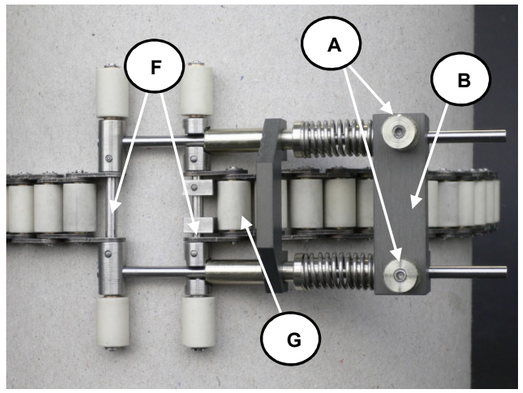
| | |
|---|---|
| 1 | roller chain with tension device |
| 1 | extensometer |
| 1 | calibration device |
| 1 | linearity chart |
| 1 | transport case |



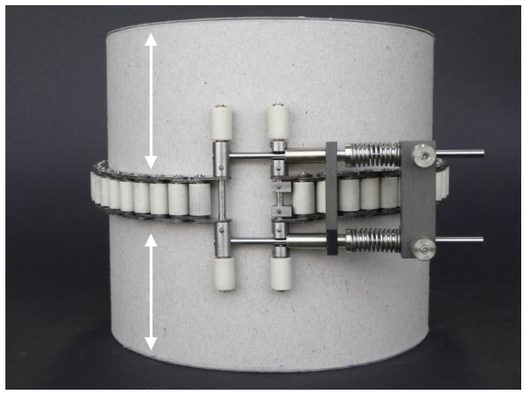
Picture 1



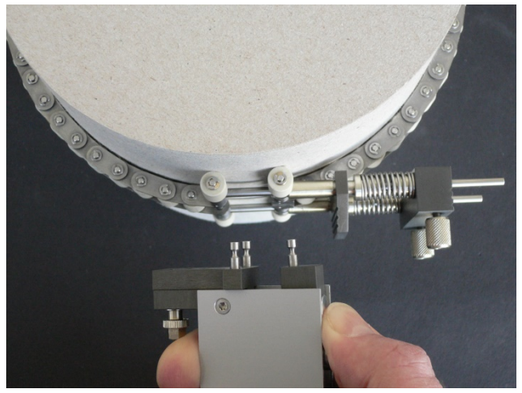
Picture 2



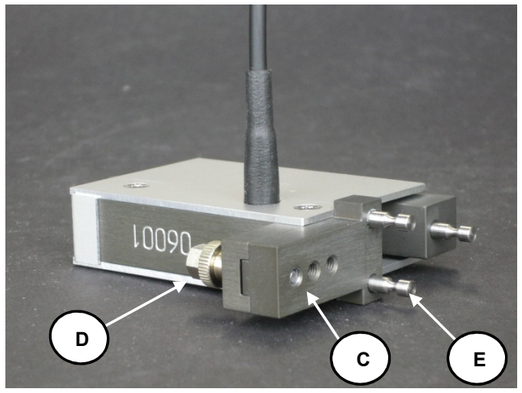

Picture 3



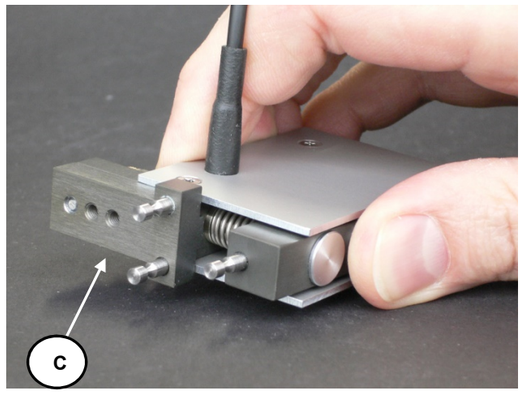
Picture 4



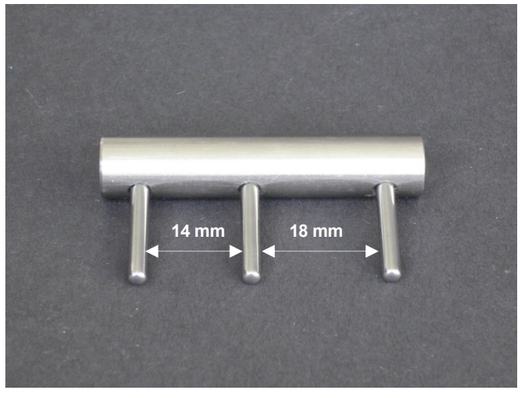
Picture 5




Picture 6




Picture 7




Picture 8