Technical data	MFE 900
Accuracy class EN ISO 9513	2 up to 1 mm stroke 1 from 1 mm stroke 0.5 from 8 mm stroke
Measurement principle	opto-incrementally
Measurement system (standard) Signal period Resolution	ERO 1480 (1 Vpp) per measuring head 100 µm ≤ 1 µm (depending on interpolation)
Measurement system (alternative) Signal period Resolution	ERO 1470 (TTL x 25) per measuring head 4 µm 1 µm (fourfold counting)
Travel	910 mm minus L_0
Initial gauge lengths	10 to 100 mm in steps of 5 mm (longer gauge lengths on inquiry)
Activating force	max. 10 cN
Clamping force	150 cN
Indication error* up to 1 mm stroke	6 µm
Indication error (rel)* up to 1 mm stroke	2 %
Indication error * from 1 mm stroke on	3 µm
Indication error (rel)* from 1 mm stroke on	1 %
Weight	32 kg

* The larger value is admissible.

Standard sample dimensions

sample thickness	up to 30 mm
sample width	up to 100 mm
sample diameter	up to 40 mm

Device options

1. Measuring system ERO 1470
   1 µm resolution (fourfold counting)
2. Measuring head for climatic chamber -50° … + 350° C
   Arm length 400 mm and 490 mm
3. Measuring arm for bending tests / Arm length 400 mm and 490 mm
   The operating of the bending test measuring arm ensued manually
4. Measurement of tube´s inner diameter
   Ø 100 … 1000 mm / Arm length 600 mm
5. Measurement of ring stiffness according to DIN EN ISO 9969
   Ø 50 … 900 mm / Arm length 228 mm

MFE 900

Long travel feeler arm extensometer

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

With validity of this issue all others lose their validity. All information is not-binding. Misprints and errors reserve.

Review .2016.09

Area of application

The MFE extensometer is specifically designed for applications with 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.

Design and function

The MFE will be operated at semi- and full automatic testing machines, particularly for applications, where the gauge length must not have to be changed very often.
The MFE works semi-automatic, the positioning of the measuring arms with respect to the middle of the sample as well as the setting of the initial gauge length has to be done manually (once before the test starts). Clamping and unclamping of the measuring arms respectively moving to the manually before adjusted position and gauge length will be done automatically (electrically motor-driven). As long as the Le-value and –position remain unchanged no manual operation is required.
The MFE is suitable for nearly all samples (from a gauge length of Le 10 mm) up to sample rupture.
Measuring direction upwards or downwards is available. The measuring heads may be removed from the device easily and quickly by means of a screw / insert system.
Measuring arms for climatic chamber (-50° … + 350° C) as well as a measuring arm for bending tests are available as an option.

Controlling

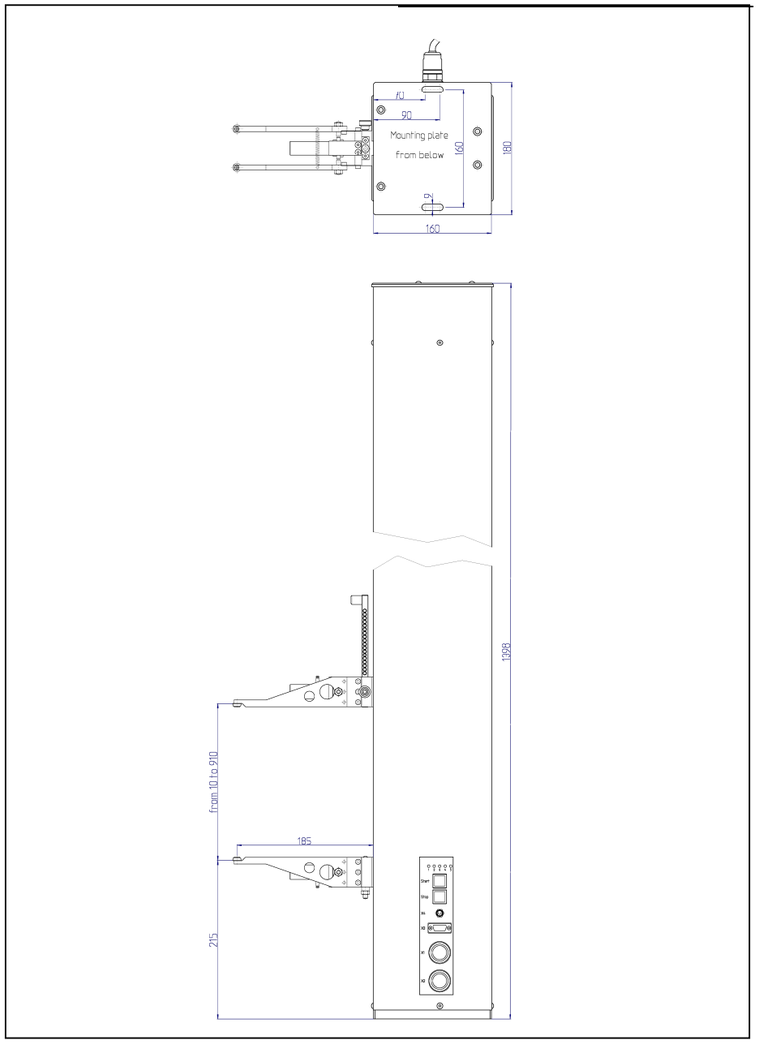
The MFE is controlled by two potential-free contacts, which switch up to 15 mA (at 24 V DC). Following 3 options could be used.

1. “Start / Stop” button on housing
2. Remote control (may be separately ordered)
3. Computer controllable by realization of the key function start / stop with help of a suitable hardware (not available at the MF GmbH)

The starting impulse through X3/6-7 (pulse length is about 100 ms) triggers downward movement of the upper measuring head (if the measuring direction is upward). When the upper measuring head reaches the lower one it is pushed downwards until it reaches the adjustable stop
“Setting – Middle of the sample”. Now the measuring arms start to close automatically. When the arms are closed the positioning motor stops and an internal contact K1 is closed. The closure of contact K1 is indicated through X3/8 and X3/9 and initiates the measuring process. The stop impulse through X3/4-5 (pulse length about 100 ms) initiates the immediate opening of the measuring arms, at which point the upper measuring head goes back downwards to its starting position. As soon as the starting position is reached the positioning motor is switched off and the contact K1 is opened.

Measuring signal

To record elongation two Heidenhain incremental encoders (ERO 1480 with 1500 Lines) are used. Each measuring head operates one incremental encoder which is evaluated through either of plugs X1 and X2. The sinusoidal incremental signals A and B are phase-shifted through 90° and have typical signal levels of 1 Vpp. The output signals initially have to be processed separately. Afterwards the signals have to be taken into account. The resolution may (depending on interpolation and method of counting) be smaller 1 µm (Recommended resolution 1 µm).
For digitization and counting Heidenhain offers (e.g.) a counter card *IK220* for IBM–compatible PC with PCI–socket with appropriate cables (without software).
For use of a “DOLI” control system a counter card of type 4INC 1206 or 2INC 1742 and a sensor connectors of type 7ISU2 2365 are needed.
Counter cards and cables are not included in the standard delivery configuration of the MFE!



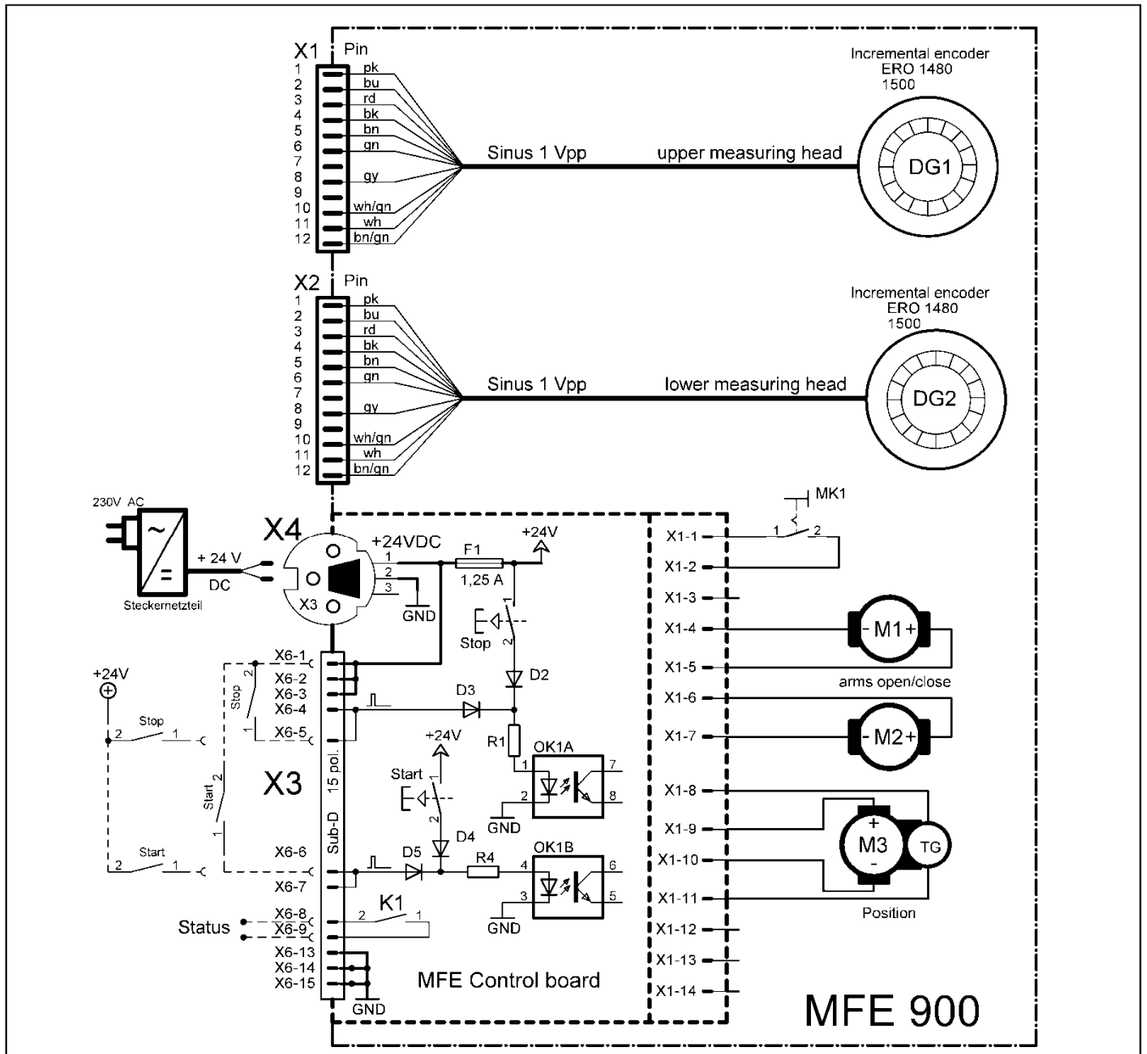
Picture 1: MFE 900 – Dimensions

Attention!

When the MFE is set up and fixed to the testing machine it is absolutely necessary to straighten the exact position of the device by means of a spirit level. This is essential for the balance weight to hang absolutely free.

Delivery scope

1	MFE
1	Power supply unit 230 V AC/24 V DC with cable length 1.8 m (for X4)
2	Connector; 12-pol. for X1; X2
1	D-Sub-Connector; 15-pol. for X3
1	Hexagon wrench 3 mm
1	Mounting plate
1	Screw driver Torx T10
1	Test report



Picture 2: MFE 900 - Connection diagram

Connection Conditions

X1- and X2– measuring signal of ERO 1470/1480 (Heidenhain Configuration)

Inbuilt socket; 12-pol. (Id.-No. 29169808)
Connector; 12-pol. for cable Ø = 8 mm (Id.-No. 29169705)

PIN	Denomination
1	-B / pink
2	5 V sensor / blue
3	+R / red
4	–R / black
5	+A / brown
6	–A / green
7	free
8	+B / grey
9	free
10	0 V / white-green
11	0 V sensor / white
12	5 V / brown / green

X3-Control

D-Sub-Connector; 15-pol.

PIN	Denomination
1-3	$+U_B$ from MFE
4-5	Stopping impulse ($+U_B$)
6-7	Starting impulse ($+U_B$)
8-9	State Measuring process "on"
10-12	Free
13-15	GND from MFE

X4–Voltage supply

Power supply unit 230 V AC/ 24 V DC (Included in delivery configuration)

PIN	Denomination
1	+24 V
2	GND

LED1 / green	MFE ready-to-operate
LED2 / yellow	Upper gauge head is moving
LED3 / red	Command to open measuring arms /
/ green	Command to close measuring arms
LED4 und 5	
/ red	opening of measuring arms
/ green	closing of measuring arms