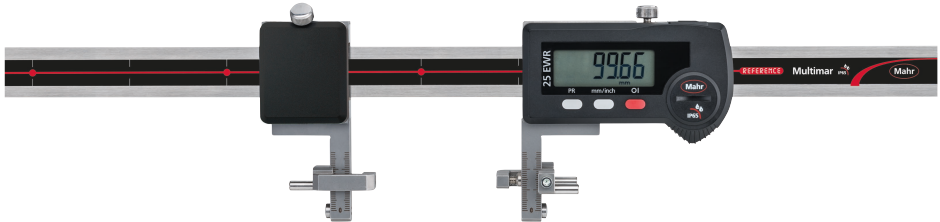




# Universal Caliper



## Multimar 25 EWR

### Operating Instructions

3722538

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**Dear valued customer,**

Congratulations on choosing a product from Mahr GmbH. Please that you follow these instructions in order to ensure the long term accuracy of this measuring instrument.

We operate a policy of continuous improvement and are constantly developing our products, especially with regard to renaming of type designations. It is possible therefore that there may be slight differences between the text and illustrations in this document and the measuring instrument in your possession. We reserve the right to make changes to the design and scope of supply, the right to undertake further technical developments, and all rights relating to translation of this documentation.

© by Mahr GmbH, Esslingen

The following symbols are used in these operating instructions:



**General information**



**Important information**



**Attention - Danger**

**Failure to follow instructions marked with these symbols can cause inaccurate results and lead to considerable damage to this product!**

## **Introduction**

### **Intended working conditions**

The Universal Caliper Multimar 25 EWR is a versatile precision measuring instrument which can be employed in both production and in inspection areas to measure the following: external and internal dimensions, external and internal threads, centering shoulders, narrow collars, recesses and grooves, external and internal tapers, external and internal tooth profiles / gears and much more.

This Universal Caliper fulfils the protection class IP 65 according to DIN EN 60529 i.e.

- Protection against the penetration of solid contaminants
- Protection against the penetration of water

In order to achieve the best use of this instrument it is most important that you read the operating instructions first.

The basic Universal Caliper Multimar 25 EWR consists of:

- Universal Caliper 25 EWR
- Wooden transport box
- 2 wooden vee-blocks (can be used as a secure storage rack or as a practical mounting aid)
- 4 fixing screws for the measuring arms (cheese head screws M3x8)
- Battery
- Operating instructions



## Safety information

This measuring instrument complies with the relevant safety regulations. It was dispatched from our production facility in a flawless condition and perfect working order. However, failure to follow the instructions given below can cause personal injury or death.

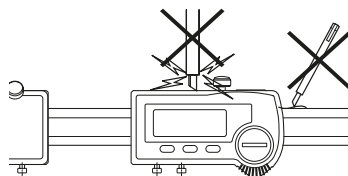
1. Before you connect up and use this measuring instrument for the first time, please read the accompanying documentation (operating instructions).
2. Keep the documentation close to the measuring instrument ready for quick reference.
3. Follow all safety precautions, accident prevention regulations and internal company rules and guidelines. If necessary you should request further information from your company safety officer.
4. The Multimar 25 EWR in conjunction with the appropriate indicating instrument and accessories are subject to inspection equipment monitoring. For this reason, regular inspection equipment monitoring performed by either the user or Mahr Service must ensure compliance to the specified error limits.

## Battery



- not rechargeable
- do not incinerate
- dispose off as prescribed

**! Do not use electric marking tool**



Dear Customer

The measuring instrument contains a non-rechargeable Lithium battery. If the battery is empty, it may not be disposed of in the household waste! Spent batteries contain toxic waste which can cause harm to the environment and cause damage to health. Spent batteries and accumulators either must be returned to an outlet where batteries or accumulators are sold, or taken to a municipal collection point, these have an (unpaid) and legal obligation to take back batteries. Please only dispose of spent batteries in the provided collection containers, when disposing Lithium batteries please cover up the poles.

The removal of batteries are described in the operating instructions / user manual of the instrument / device.

All batteries can be recycled; raw materials such as iron, zinc or nickel can be obtained from recycled batteries, thus battery recycling helps with the protection of the environment.



## ! Important hints prior to using the Multimar 25 EWR

- The measuring instrument may only be used for its intended purpose. For damages caused by other usage or as a result of the incorrect application of this measuring instrument, no liability will be accepted.
- In order to ensure a long use of this caliper, any contamination on the caliper must be removed immediately after completion of usage. This can be done with a dry cloth. Subsequently, to conserve the metal components, these should be lightly smeared with slushing oil.
- Protect the data output opening with the respective cover when not in use.
- Clean a dirty housing with a dry, soft cloth. Remove heavy soiling with a cloth wetted with a neutral reacting solvent. Volatile organic solvents like thinners are not to be used, as these liquids can damage the housing.
- Unauthorized opening of the instrument forfeits the warranty.
- When the „Low-Bat“ symbol appears the intended operation or function can no longer be guaranteed.

We wish you a satisfactory and long service with your measuring instrument. Should you have any questions regarding the instrument, contact us and we shall be pleased to answer them.

### Confirmation of traceability

We declare under our sole responsibility that this product is in conformity with standards and technical data as specified in our sales documents (operating instructions, leaflet, catalog).

We certify that the measuring equipment used to check this product, and guaranteed by our Quality Assurance, is traceable to national standards.

Thank you very much for your confidence in purchasing this product.

### EC Declaration of Conformity

This measuring instrument conforms to the Low Voltage Directive 2006/95/EG and the Directive 2004/108/EG which concerns Electromagnetic compatibility.

Old electronic equipment of the type 25 EWR which where bought from Mahr after the 23. March 2006 can be returned to us for disposal. We will dispose/recycle our products without causing any harm or damage to the environment in accordance to the EU-Directives 2002/95/EC RoHS (the Restriction of the use of certain Hazardous Substances) and 2002/96/EC WEEE (Waste Electrical and Electronic Equipment) as well as German National - Electrical and Electronic Equipment Act, FRG.

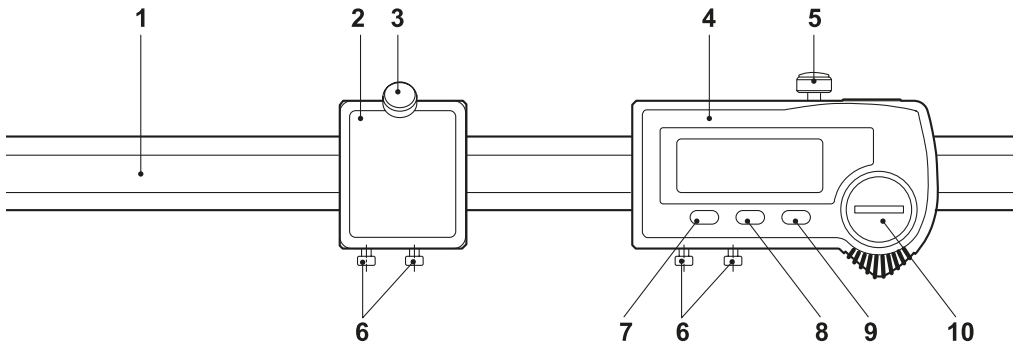
We reserve the right to make changes to our products, especially due to technical improvements and further developments. All illustrations and technical data are therefore without guarantee.

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## 1. Description



- 1 Beam
- 2 Stationary measuring arm holder (adjustable)
- 3 Locking screw
- 4 Moveable arm holder with module housing and display
- 5 Locking screw
- 6 Fixing screws for measuring arms
- 7 Preset button
- 8 mm/inch, Lock button
- 9 ON/OFF / Reset button
- 10 Battery compartment

## 2. Measuring Range

Measuring range external mm	Measuring range external extended mm	Measuring range internal mm	Measuring range internal extended mm	Order no.
0 - 300	75 - 380	30 - 330	110 - 410	<b>4119000</b>
0 - 600	75 - 680	30 - 630	110 - 710	<b>4119001</b>
0 - 1000	75 - 1080	30 - 1030	110 - 1110	<b>4119002</b>
0 - 1250	75 - 1330	30 - 1280	110 - 1360	<b>4119003</b>

All dimensions in mm

### 3. Technical Data

**Inductive measuring system:** 10 mm/12,5 mm liquid crystal display

**Battery:** Lithium 3V, Type CR2032, 230 mAh operating time approx. 3 years (2000 work. hors./year)

**Protection group:** IP65 acc. DIN EN 60529  
6 = Protection against the penetration of solid contaminants  
5 = Protection against the penetration of water

**Data output:**

- OPTO RS232C compatible via interface cable with optocoupler,
- Digimatic
- USB

**Operating temperature:** + 10°C ... + 40°C

**Storage temperature:** - 10°C ... + 60°C

Measuring range mm	Resolution	Measuring value mm	MPE <sub>E</sub>	Standard
0 - 300	0.01 mm / .0005"	0 ≤ 600	30	Mahr company standard
0 - 600				
0 - 1000				
0 - 1250				
0 - 1000	0.01 mm / .0005"	> 600 ≤ 1250	40	Mahr company standard
0 - 1250				

#### Annotations to Mahr company standard

The accuracy is defined only for measuring arms with length 25 mm of the types Te, Tma, Tmi in combination with the anvils, eg. Ta, Ti, Tp, Ts. suitable for a particular measuring task.

MPE<sub>E</sub> is symmetrical (±) and there is no span (no floating zero point, according to DIN 862).


In measurements with changes of the measuring direction MPE<sub>E</sub> increases by 20 µm (according to DIN 862).

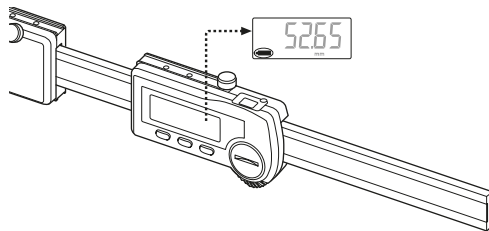
Measuring force: 8 N ± 2N

The decision rules regarding conformity are according to ISO 14253-6 "simple acceptance".

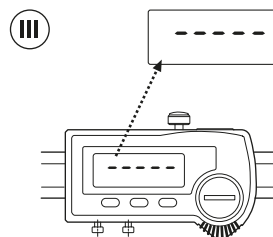
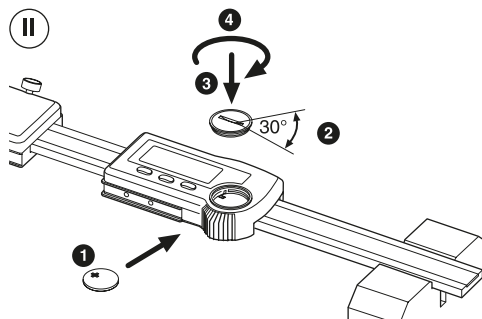
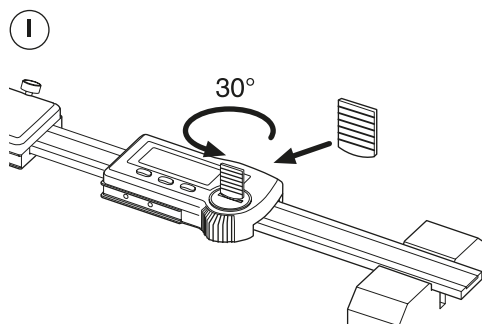
## 4. Changing the battery

### 4.1 Inserting / changing the battery

- When the battery is low, the following  symbol will appear in the display

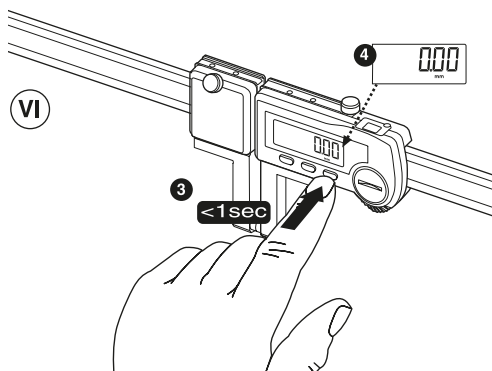
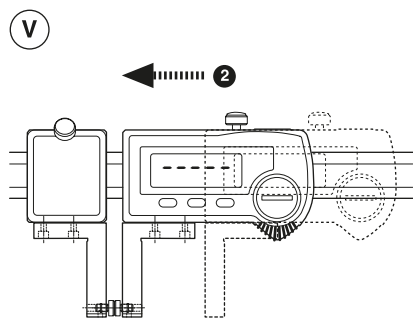
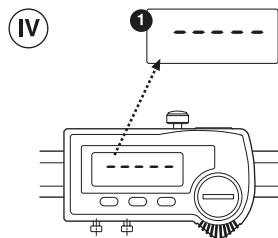


- Changing the battery





## 4.2 Set the zero point

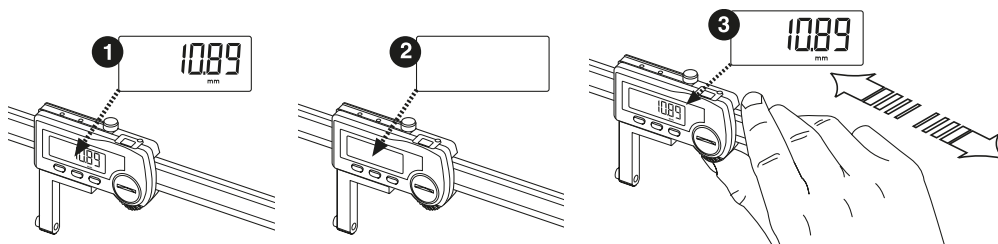


## 5. Functions

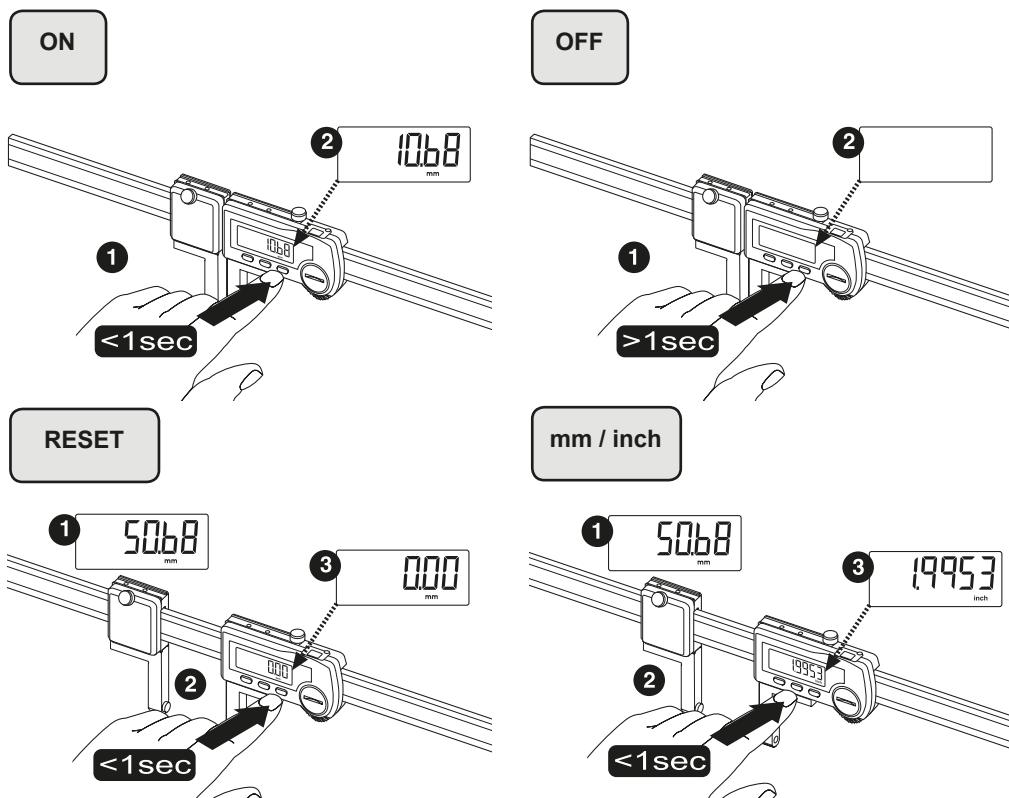
### 5.1 Auto OFF / ON

#### Auto OFF / Auto ON

If the instrument has not been used for 10 minutes or more, it will be automatically switch OFF. Movement of the slide will automatically switch ON the instrument.



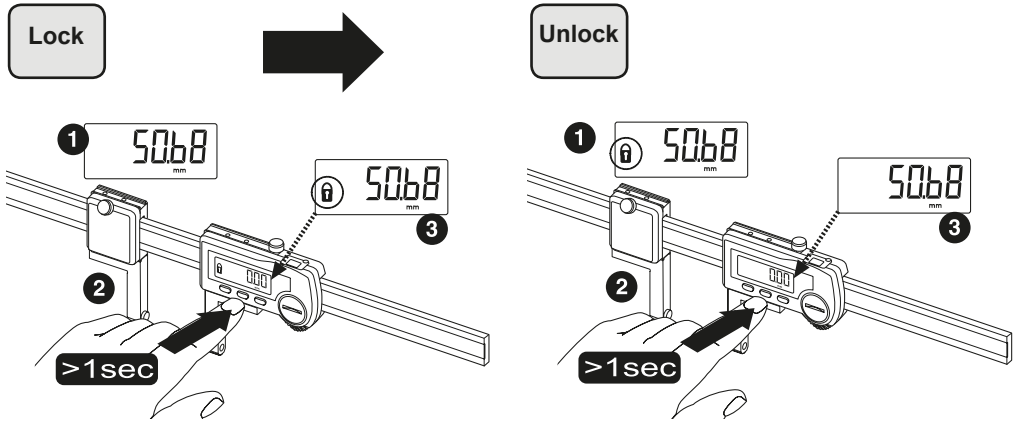
### 5.2 Classic Mode



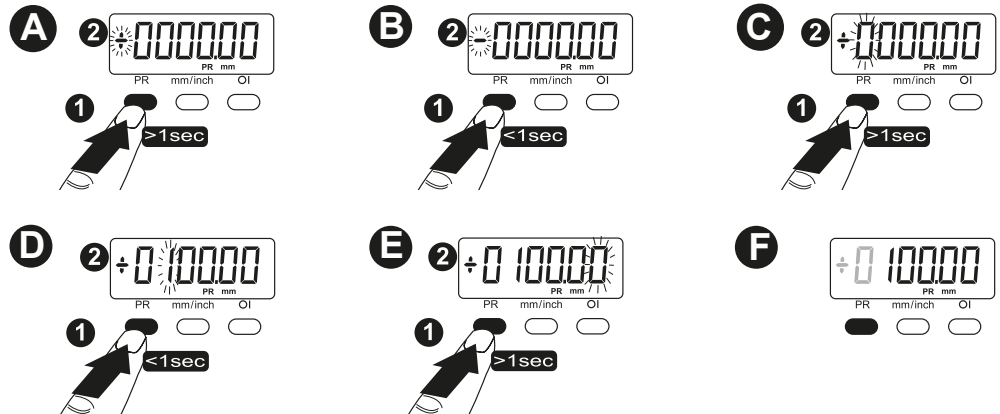
### 5.3 Reference Mode (recommended)

#### LOCK-Function

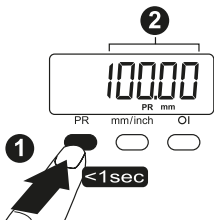
Activating the Lock function prevents accidentally changing either the zero point/PRESET or the unit of measurement (mm/inch).



### 5.4 Entering a PRESET value

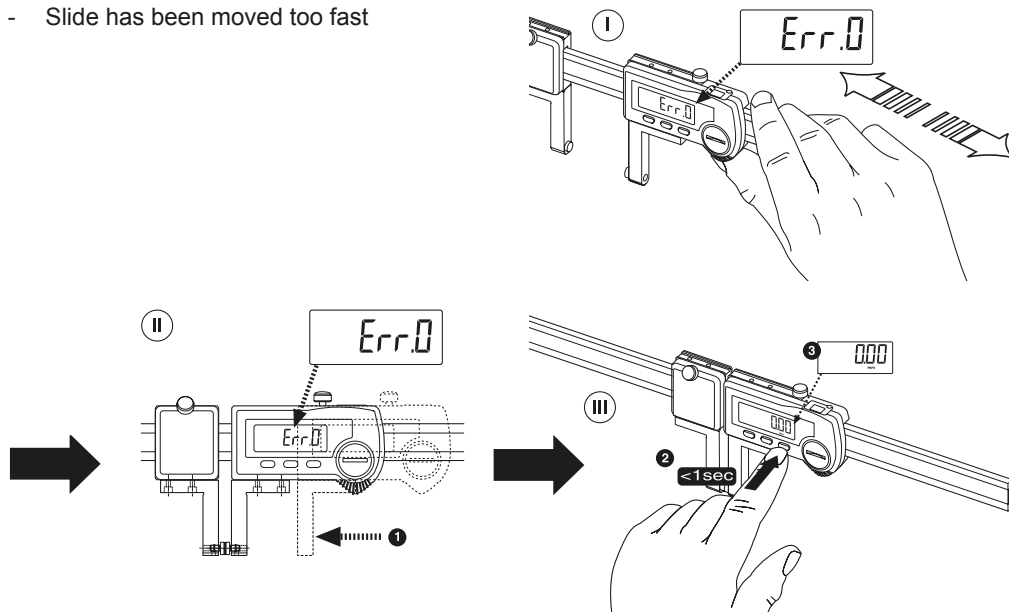


### 5.5 Select a PRESET value



## 6. Display Messages

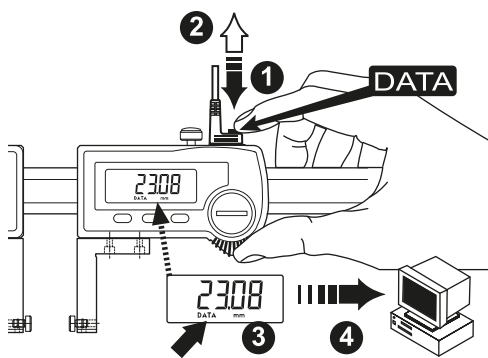
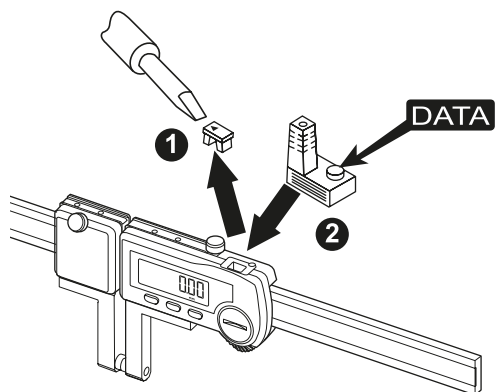
- Slide has been moved too fast



## 7. Data Output

Establish a data connection

Trigger off a data connection



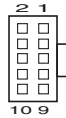
**Digimatic**  
Data cable 16 EXD

Order no. 4102411

**Opto RS232C**  
Data cable 16 EXR

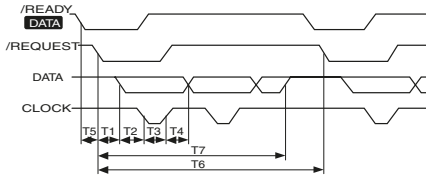
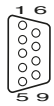
Order no. 4102410

Pin No.	I/O	Function
1		GND
2	O	DATA
3	O	CLOCK
4	O	READY
5	I	REQUEST
6		N.C.
7		N.C.
8		N.C.
9		N.C.
10		N.C.



O = Output  
I = Input

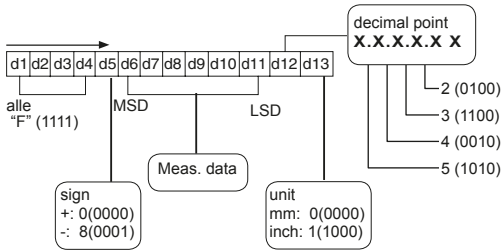
Pin No.	Function
1	
2	Txd Data output
3	Rxd -Vdd
4	DTR Request
5	I N.C.
6	N.C.
7	+Vdd
8	N.C.
9	N.C.



172 ms	≤ T1	≤ 338 ms
66 μs	≤ T2	≤ 120 μs
	T3	= 104 μs
66 μs	≤ T4	≤ 144 μs
	T5	= depends on the performance of the data processing unit
	T6	≥ 408 ms
189 ms	≤ T7	≤ 355 ms

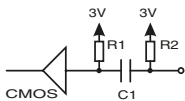
**Datenübertragungsformat:**

Sequence



**Electronic circuit for input:**

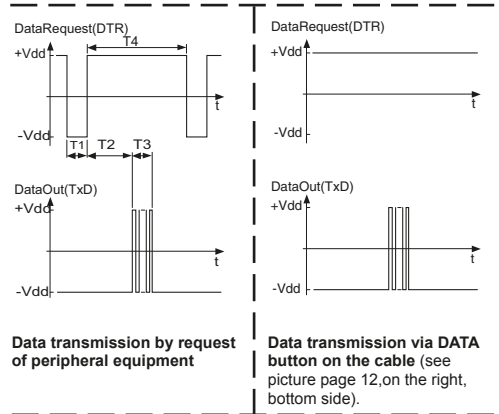
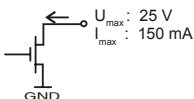
/REQUEST



R1 = 600 K - 800 K  
R2 = 910 K  
C1 = 1 nF

**Electronic circuit for output:**

DATA+CLOCK



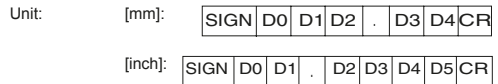
**Data transmission by request of peripheral equipment**

**Data transmission via DATA button on the cable** (see picture page 12, on the right, bottom side).

**Transmission parameter:**  
1 startbit; 7 bit databits; even parity; 2 stopbits; 4800 bauds

100 ms	≤ T1	≤ 1000 ms
15 ms	≤ T2	≤ 160 ms
35 ms	≤ T3	≤ 40 ms
300 ms	≤ T4	

**Data in ASCII format:**



**Power supply:**

via RS232 port of the peripheral equipment

+ VDD von RTS  
- VDD von TxD

**USB (Com-Port Emulation)****Data cable 16 EXu    Order no. 4102357****Virtual COM-Interface-Driver:**

The Driver and instructions are supplied with the 16 EXu cable.

The Driver emulates for every connected cable an additional virtual COM-Port. The application software communicates to the instrument in exactly the same manner as a normal hardware COM-Port.

**Data in ASCII format:**

Unit:            [mm]:

SIGN	D0	D1	D2	.	D3	D4	D5	CR
------	----	----	----	---	----	----	----	----

[inch]:

SIGN	D0	.	D1	D2	D3	D4	D5	CR
------	----	---	----	----	----	----	----	----

## 8. Care and Maintenance

Accumulation of dirt on the measuring faces can impair the measuring results; therefore the measuring faces must be kept clean of dirt, dust and other contamination.

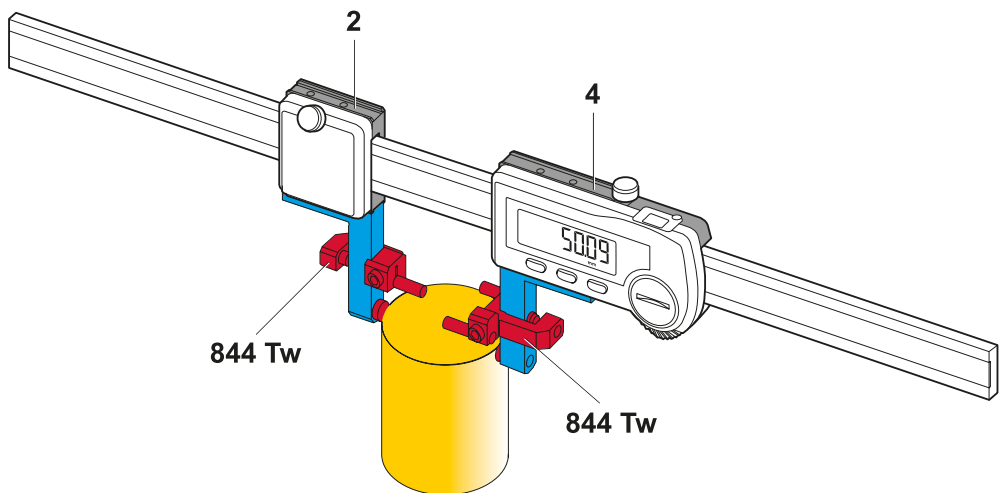
After being used, the measurement instrument should be cleaned with a dry, soft cloth.

Remove heavy soiling with a cloth wetted with a neutral solvent. Volatile organic solvents like thinners are not to be used, as these liquids can damage the individual components.

Should you have any questions regarding the instrument, contact us and we shall be pleased to answer them.

## 9. Setting up the measuring arm holder

Both the measuring arm holders (2, 4) must be equipped with the appropriate accessories according to the measuring task. When used in conjunction with the Adaptor 844 Tad this instrument is compatible with all the available measuring anvils with a M2.5 thread. In order to always achieve reliable and accurate measuring results we recommend the use of the Depth stop 844 Tw. Due to the exact positioning of the stops on the measuring arms it is possible to ensure pendular motion along a plane parallel. Therefore accurate and continuously accurate measurements can be guaranteed.



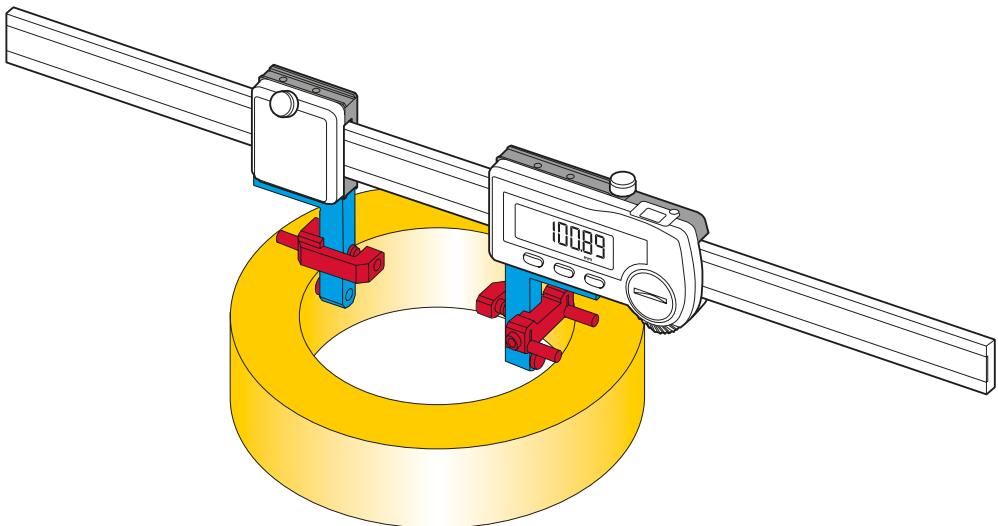
## 10. Setting with measuring standards (e.g. setting ring, combination of gage blocks, master, etc.)

### Comparative measurement

- Position the Multimar 25 EWR on the measuring standard
- With light pendular motion determine the position of the reversal point (Min. and/or Max value) and here set the indicating instrument to "0".

### Absolute measurement

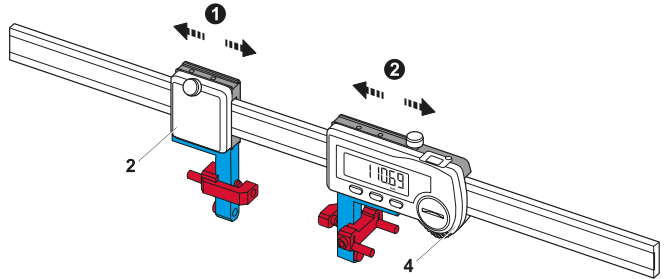
- Enter the PRESET value corresponding to the measuring standard
- Position the Multimar 25 EWR on the measuring standard
- With light pendular motion determine the position of the reversal point (Min. and/or Max value) and here set the indicating instrument to the default PRESET value





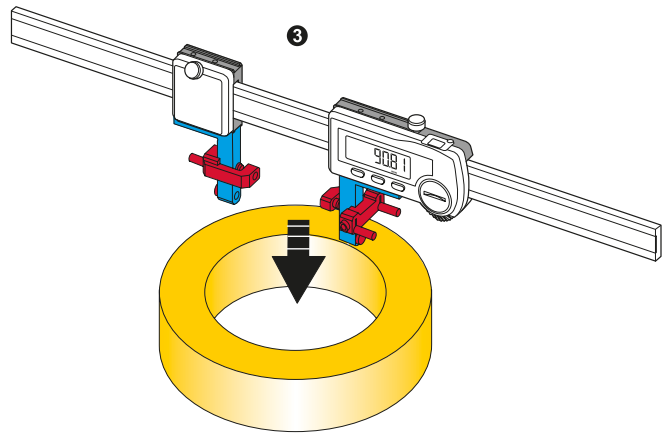
## 11. Measurement

- Bring the (left) moveable measuring arm holder 2 in to the position of measurement



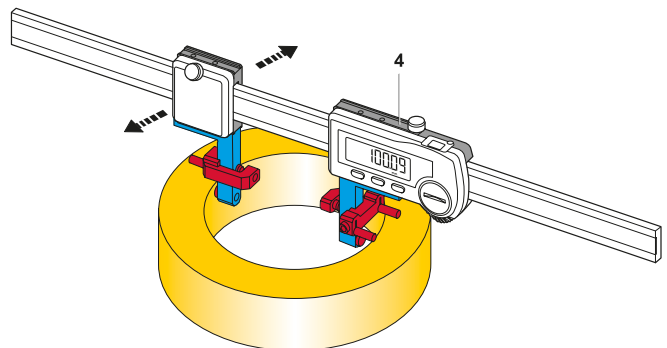
- Move the right measuring arm holder 4 so that the caliber could be brought in proper position.

- Bring the caliper Multimar 25 EWR in measuring position.




- Bring the right measuring arm holder 4 in contact on the work piece.

- Determine the reversal point (Min and/or Max value) with pendular motion



- Read off the measuring result on the indicating instrument

## 12. Accessories

 By rotating the measuring arms the application range can be extended.

### Measuring Arms 844 Te and Depth Stops 844 Tw

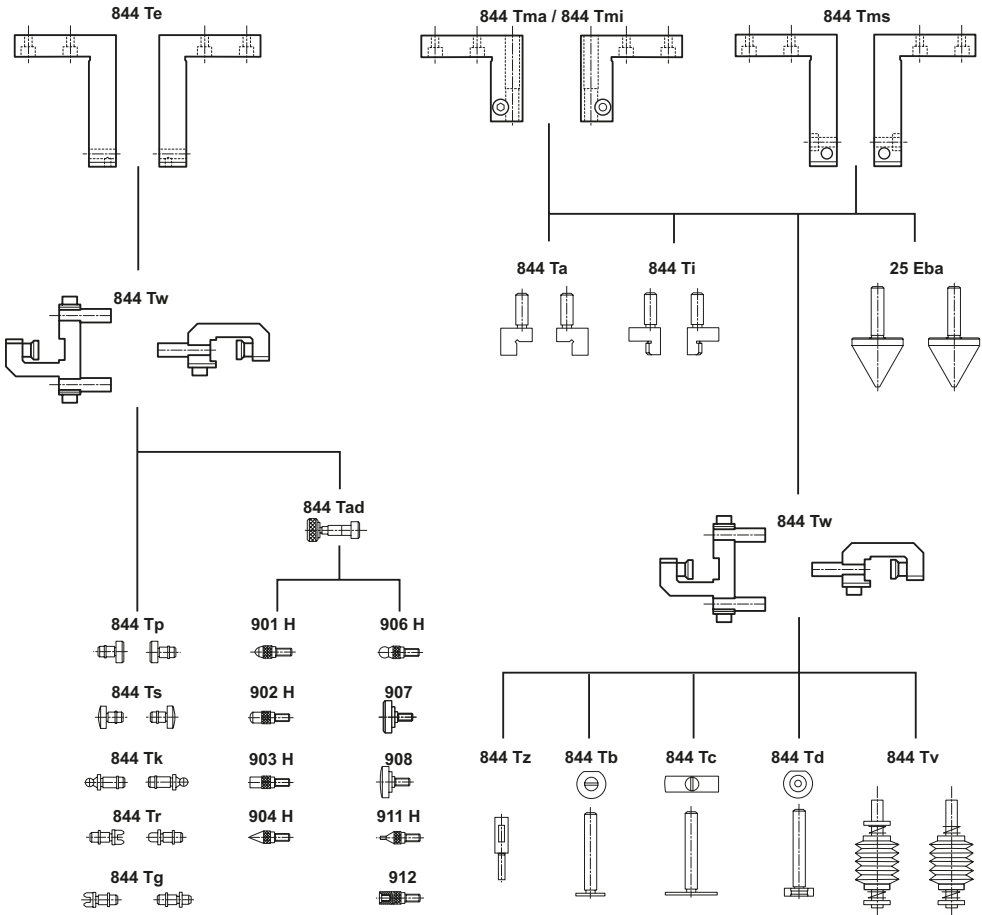
In combination with Measuring anvils **844 Tp, 844 Ts, 844 Tk, 844 Tr, 844 Tg**  
 In combination with Adaptor **844 Tad** and Measuring anvils **901 H - 912**

### Measuring Arms 844 Tma and Depth Stops 844 Tw

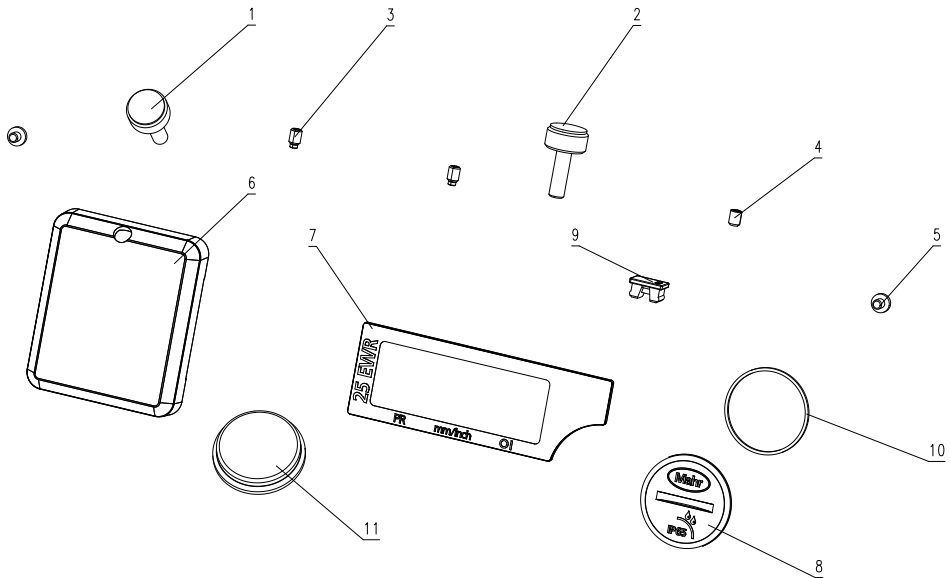
In combination with Measuring anvils: **844 Ta, 844 Tb, 844 Tc, 844 Td, 844 Tv, 844 Tz**

### Measuring Arms 844 Tmi and Depth Stops 844 Tw

In combination with Measuring anvils: **844 Ti, 844 Tj, 844 Tc, 844 Td, 844 Tv, 844 Tz**



### 13. Spare Parts



Pos.	Order no.	Contents (P.U.)	Description
1	x		Clamping screw, slide left
2	4112970-E	1	Clamping screw
3	4879595-E	1	Set screw with short shaft DIN 915-M 3x5-45H
4	4880323-E	1	Set screw DIN 913-M 3x4-45H
5	4879594-E	4	Oval-head screw DIN 7985-M 2,5x3 zinc
6	x		Cover slide left
7	x		Glass
8	4112929-E	1	Battery cover
9	4337335-E	1	Cover data output, black
10	4885184-E	1	Seal ring, 21x1 mm
11	x		Battery 3V, 230 mAh

