

## Test Indicators

|                                                                  |       |
|------------------------------------------------------------------|-------|
| Testing of Test Indicators, Dial Indicators and Dial Comparators | 3 - 2 |
| Test Indicators Puppitast                                        | 3 - 3 |
| Accessories for Test Indicators                                  | 3 - 5 |

## Dial Indicators

|                                   |        |
|-----------------------------------|--------|
| Mechanical Dial Indicators        | 3 - 7  |
| Digital Dial Indicators Millitast | 3 - 12 |

## Dial Comparators

|                                                 |        |
|-------------------------------------------------|--------|
| Mechanical Dial Comparator                      | 3 - 16 |
| Mechanical Dial Comparators with Limit Contacts | 3 - 18 |
| Mechanical Comparator with Limit Contacts       | 3 - 20 |
| Electrical Indicator 1141 SN                    | 3 - 20 |
| Millimess, large type                           | 3 - 21 |
| Inductive Dial Comparator Extramess             | 3 - 22 |

## Accessories for Dial Indicators and Dial Comparators

|                |        |
|----------------|--------|
| Contact Points | 3 - 24 |
|----------------|--------|

## Testing of Test Indicators, Dial Indicators and Dial Comparators



All test indicators, dial indicators and dial comparators are subject to a final inspection in production on Mahr measuring machines (865, 875 and Optimar 100).

The following, in

- DIN 2270 (test indicators)
  - DIN 878 (dial indicators)
  - DIN 879 (dial comparators)
- defined parameters, will be tested:

### • Span of error $f_e$

Span of error  $f_e$  is the distance between the ordinates of the highest and lowest points in the deviation diagram either when the plunger is being pressed in (dial indicators, dial comparators) or in the case of excursion of stylus against measuring force (test indicators).

### • Total span of error $f_{ges}$

The total span of error  $f_{ges}$  is the distance between the ordinates of the highest and lowest points in the deviation diagram when the plunger is being pressed in and let out (dial indicators, dial comparators) or in the case of excursion of stylus against and with the same direction of measuring force (test indicators). The total span of error includes the hysteresis error of the measured value  $f_u$ .

### • Local span of error $f_t$

Span of error  $f_t$  is the distance between the ordinates between the highest and lowest points in the deviation diagram, measured for a local measuring span of 10 scale divisions within 0,1 mm when the plunger is being pressed in (dial indicators, dial comparators) or in the case of excursion of stylus against measuring force (test indicators).

### • Repeatability $f_w$

Repeatability  $f_w$  is a characteristic for measured value fluctuations in measurements of the same measurand within the measuring span and with the same direction of movement of the plunger (dial indicators, dial comparators) or of the stylus (test indicators).

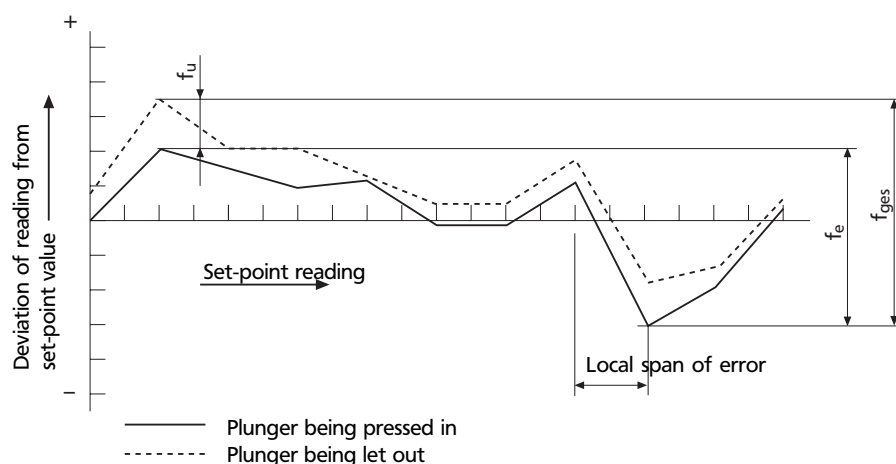


Diagram for the spans of error  $f_e$  and  $f_{ges}$  and hysteresis error of the measured value  $f_u$  (example)

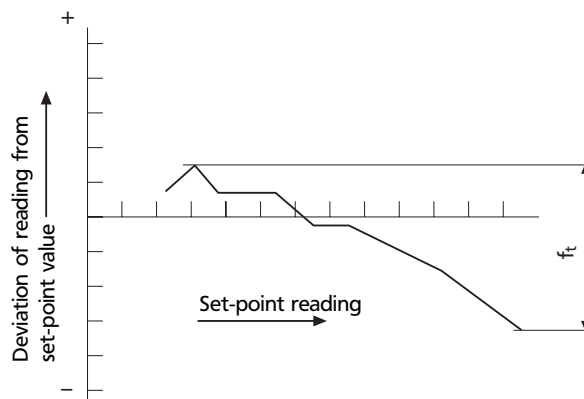


Diagram of the span of error  $f_t$  (example)

## Design features of Mahr Test Indicators Puppitast

- Easy to read thanks to high-contrast, rotatable dial face
- Box-type housing open on one side only
- Bottom and side walls made of one piece. This shell totally encloses the movement and provides maximum protection against shock and damage
- The front end of the housing is of fork-shaped design with the stem of the stylus mounted in the fork to provide high stability. The precision alignment of the two bearings ensures maximum accuracy



- Self-contained movement. This unit can be easily removed and quickly replaced for maintenance and repair purposes.
- Insensitivity to magnetic fields

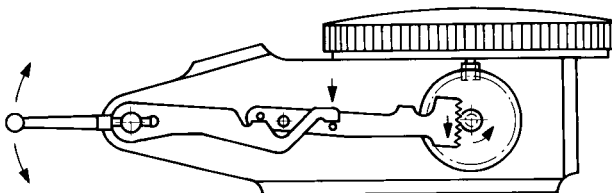
- Overload protection provided by slip clutch
- Low measuring force



- Maximum sensitivity and accuracy provided by precision gears and pinions
- Jewelled movement bearings



- Corrosion-proof due to satin-chrome finish on housing



- Rigid mounting
- Mounting shank can move on three dovetail guideways which are integral parts of the sturdy housing
- They can be clamped at any desired point with a knurled nut. No tools are required.
- No plastic parts except for transparent cover over dial face

- Automatic matching to sensing direction, i. e. pointer always moves in clockwise direction, thus ensuring error-free reading



**800 S**  
Standard model



**800 SG**  
Extra-large dial face



**800 SL**  
Extra-long stylus

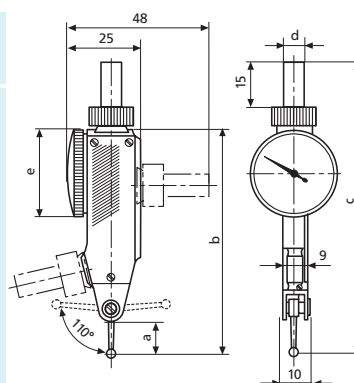
### Technical Data

|                | Measuring range              | Readings          | Dial diam.    | Swivel-range of styluses | Measuring force | $f_e$      | $f_{ges}$  | $f_u$     | Order no.      |
|----------------|------------------------------|-------------------|---------------|--------------------------|-----------------|------------|------------|-----------|----------------|
| <b>800 S</b>   | $\pm 0,4$ mm                 | 0,01 mm           | 27,5 mm       | 11,5 mm                  | 0,15 N          | 10 $\mu$ m | 13 $\mu$ m | 3 $\mu$ m | <b>4305100</b> |
| <b>800 SG</b>  | $\pm 0,4$ mm                 | 0,01 mm           | 38 mm         | 11,5 mm                  | 0,15 N          | 10 $\mu$ m | 13 $\mu$ m | 3 $\mu$ m | <b>4307100</b> |
| <b>800 SL</b>  | $\pm 0,4$ mm                 | 0,01 mm           | 27,5 mm       | 36 mm                    | 0,07 N          | 10 $\mu$ m | 13 $\mu$ m | 5 $\mu$ m | <b>4306100</b> |
| <b>800 SM</b>  | $\pm 0,1$ mm                 | 0,002 mm          | 38 mm         | 11,5 mm                  | 0,15 N          | 3 $\mu$ m  | 4 $\mu$ m  | 2 $\mu$ m | <b>4308100</b> |
| <b>800 W</b>   | $\pm 0,4$ mm                 | 0,01 mm           | 27,5 mm       | 12 mm                    | 0,3 N           | 10 $\mu$ m | 13 $\mu$ m | 5 $\mu$ m | <b>4303000</b> |
| <b>800 SGI</b> | $\pm 0,3$ mm ( $\pm .15''$ ) | 0,01 mm (.0005'') | 38 mm (1.5'') | 11,5 mm (.45'')          | 0,15 N          | .0004''    | .0005''    | .00012''  | <b>4307106</b> |
| <b>800 SZ</b>  | $\pm .015''$                 | .0005''           | 1.1''         | .45''                    | 0,15 N          | .0004''    | .0005''    | .00012''  | <b>4305910</b> |
| <b>800 SGZ</b> | $\pm .015''$                 | .0005''           | 1.5''         | .45''                    | 0,15 N          | .0004''    | .0005''    | .00012''  | <b>4307910</b> |
| <b>800 SLZ</b> | $\pm .015''$                 | .0005''           | 1.1''         | 1.35''                   | 0,07 N          | .0004''    | .0005''    | .0002''   | <b>4306910</b> |
| <b>800 SMZ</b> | $\pm .004''$                 | .0001''           | 1.5''         | .45''                    | 0,15 N          | .00012''   | .00016''   | .00008''  | <b>4308910</b> |
| <b>800 WZ</b>  | $\pm .015''$                 | .0005''           | 1.1''         | .47''                    | 0,3 N           | .0004''    | .0005''    | .0002''   | <b>4303900</b> |

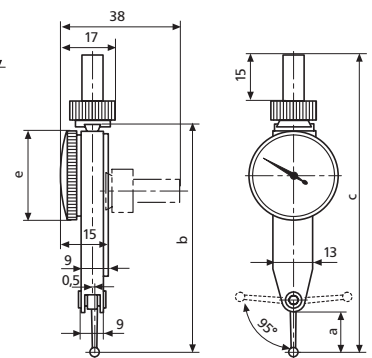
**800 S**

#### Diameters mm

|                | a    | b     | c     | d                       | e  |
|----------------|------|-------|-------|-------------------------|----|
| <b>800 S</b>   | 11,5 | 76    | 99    | 8h6                     | 29 |
| <b>800 SG</b>  | 11,5 | 76    | 99    | 8h6                     | 40 |
| <b>800 SL</b>  | 36   | 100,5 | 123,5 | 8h6                     | 29 |
| <b>800 SM</b>  | 11,5 | 76    | 99    | 8h6                     | 40 |
| <b>800 W</b>   | 12   | 73    | 96    | 8h6                     | 29 |
| <b>800 SGI</b> | 11,5 | 76    | 99    | 8h6 and $\frac{1}{4}''$ | 40 |
| <b>800 SZ</b>  | 11,5 | 76    | 99    | 8h6 and $\frac{1}{4}''$ | 29 |
| <b>800 SGZ</b> | 11,5 | 76    | 99    | 8h6 and $\frac{1}{4}''$ | 40 |
| <b>800 SLZ</b> | 34   | 98,5  | 121,5 | 8h6 and $\frac{1}{4}''$ | 29 |
| <b>800 SMZ</b> | 11,5 | 76    | 99    | 8h6 and $\frac{1}{4}''$ | 40 |
| <b>800 WZ</b>  | 11,3 | 72,3  | 95,3  | 8h6 and $\frac{1}{4}''$ | 29 |



**800 W/800 WZ**



Standard accessories:  
Mounting shank 8h6 mm and  $\frac{1}{4}''$   
(for instruments with inch-scale),  
stylus dia. 2 mm and plastic case

# Test Indicators

**Mahr**



**800 SM**  
with high resolution



**800 W**  
Stylus moves parallel  
to dial



**800 SGI**  
with mm/inch scale

## Accessories

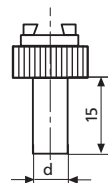
### Styluses 801 t

| for types        | Stylus<br>length<br>/in mm | 801 te<br>chromium-plated<br>ball dia. in mm |         |         | 801 tl<br>chromium-plated<br>ball dia. in mm |         | 801 tr, with<br>ruby ball<br>ball dia. in mm |
|------------------|----------------------------|----------------------------------------------|---------|---------|----------------------------------------------|---------|----------------------------------------------|
|                  |                            | ø1                                           | ø2      | ø3      | ø1                                           | ø2      | ø2,5                                         |
| 800 S / 800 SZ   | 16,1                       | 4309015                                      | 4309016 | 4309014 |                                              |         | 4309088                                      |
| 800 SG / 800 SGZ | 16,1                       | 4309015                                      | 4309016 | 4309014 |                                              |         | 4309088                                      |
| 800 SM           | 16,1                       | 4309015                                      | 4309016 | 4309014 |                                              |         | 4309088                                      |
| 800 SMZ          | 16,1                       | 4309015                                      | 4309016 | 4309014 |                                              |         | 4309088                                      |
| 800 W            | 16,85                      | 4309011                                      | 4309012 | 4309013 |                                              |         | 4309030                                      |
| 800 WZ           | 16,1                       | 4309015                                      | 4309016 | 4309014 |                                              |         | 4309088                                      |
| 800 SGI          | 16,1                       | 4309015                                      | 4309016 | 4309014 |                                              |         | 4309088                                      |
| 800 SL           | 40                         |                                              |         |         | 4309021                                      | 4309020 |                                              |
| 800 SLZ          | 38                         |                                              |         |         |                                              | 4309920 |                                              |

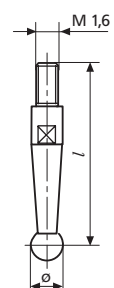
### Mounting Shank 801 a

|           | mounting shank dia. d | Order no. |
|-----------|-----------------------|-----------|
| 801 a8    | 8h6 mm                | 4300800   |
| 801 a4    | 4h6 mm                | 4300801   |
| 801 a1/4" | 1/4" (6,35 mm)        | 4300805   |

### 801 a



### 801 t



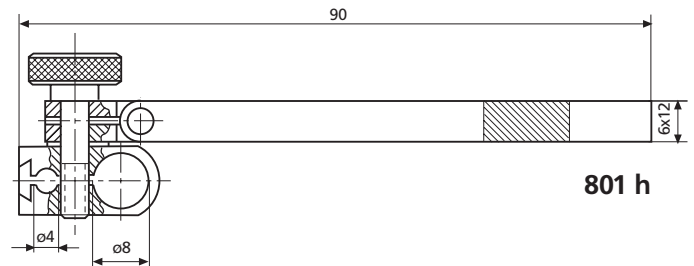
|                                                                               | Order no.   |
|-------------------------------------------------------------------------------|-------------|
| Spanner for changing styluses                                                 | 4309040     |
| Adapter Bush for adapting<br>mounting shank dia. 8h6 mm<br>to inch bore .375" | 940 4310103 |

## Accessories

### Universal Holder 801 h

- For mounting test indicators on machine tools
- With swivel-type knuckle

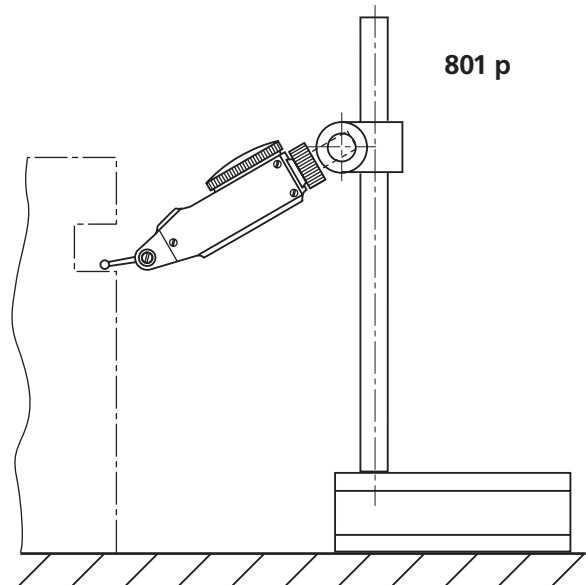
Order no. 4309066



### Stand 801 p

- With swivel holder
- Base with V-groove 140°
- Overall height 150 mm
- Mounting bore dia. 4 and 8 mm
- Column dia. 8 mm
- Base surface 65 x 40 mm

Order no. 4309081

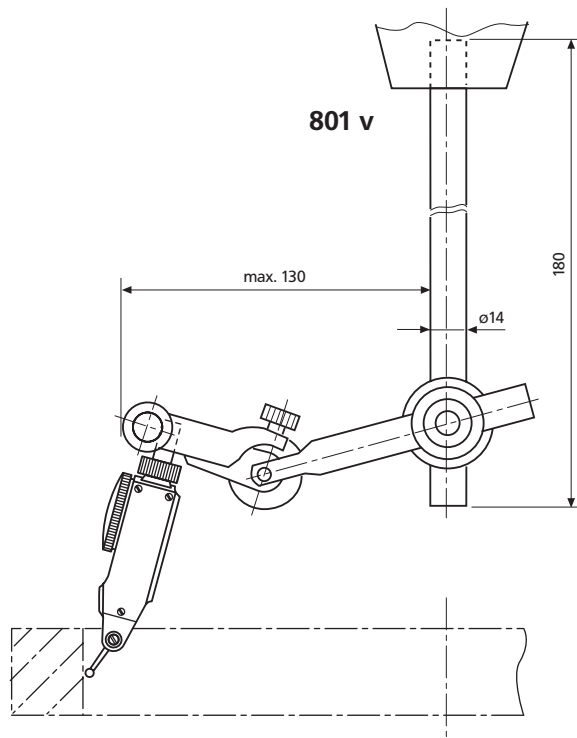


### Centering Support Rods 801 v

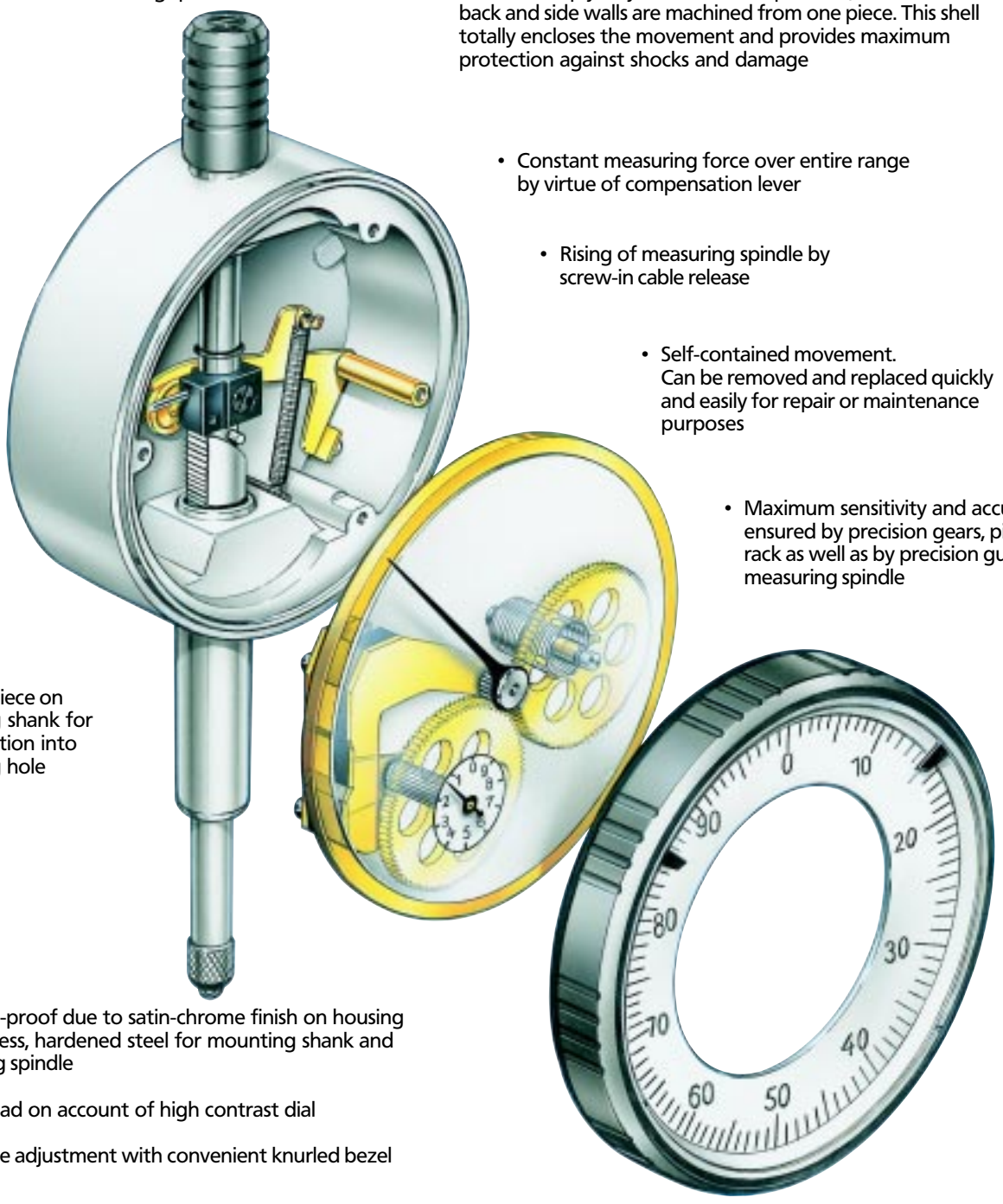
- For aligning and centering workpieces on machine tools
- Swivel mounting clamp and fine adjustment
- Stainless steel rods

Mounting bore dia. 8 mm  
Swivel range of mounting clamp 180°

Order no. 4309070



## Design features of Mahr dial indicators

- Protective and lifter cap mounted on upper end of measuring spindle
  - Protective housing only opens at the front. The housing is thus not simply a cylinder with a cap over it, but rather the back and side walls are machined from one piece. This shell totally encloses the movement and provides maximum protection against shocks and damage
  - Constant measuring force over entire range by virtue of compensation lever
  - Rising of measuring spindle by screw-in cable release
  - Self-contained movement. Can be removed and replaced quickly and easily for repair or maintenance purposes
  - Maximum sensitivity and accuracy ensured by precision gears, pinion and rack as well as by precision guide for measuring spindle
  - Tapered piece on mounting shank for easy insertion into mounting hole
  - Corrosion-proof due to satin-chrome finish on housing and stainless, hardened steel for mounting shank and measuring spindle
  - Easy to read on account of high contrast dial
  - Simple fine adjustment with convenient knurled bezel
  - Shockproof movement  
On all dial indicators with the exception of the long-range model 810 V the rack is not located directly on the measuring spindle, but rather on a sleeve which floats on the spindle. The shocks to which the spindle is subjected in everyday use are therefore not transmitted to the rack and mechanism. In the event of shocks, the sleeve lifts off and follows slowly due to spring force. The movement is thus reliably protected even against severe shocks.
  - Adjustable tolerance markers for setting tolerance limits
- 

**Dial Indicators** shockproof version according to DIN 878



803



803 W



810/810 L



810 W

## Features

### Small Dial Indicator 803

where available space is limited

- Shockproof via sleeve which floats over the spindle
- Constant measuring force
- Protective housing (back wall integrated in housing)
- Raising of measuring spindle via lifting cap
- Adjustable tolerance markers
- Delivered in plastic case

### Small Dial Indicator 803 W

waterproof and oilproof

- Design features identical to 803, but
- Upper protective cap on measuring spindle as well as bezel and transparent dial cover with O-rings hermetically sealed
- Measuring spindle sealed by means of rubber sleeve, thus preventing contamination by liquids and impurities
- Delivered in plastic case

### Dial Indicator 810

standard version

- Shockproof via sleeve which floats over the spindle
- Constant measuring force
- Protective housing (back wall integrated in housing)
- Raising of measuring spindle via lifting cap or cable release 951 (accessory)
- Adjustable tolerance markers
- Delivered in plastic case

### Dial Indicator 810 L

- Design features identical to 810, but with tapped holes for mounting lugs 961 and 962 (accessories)
- Delivered in plastic case

### Dial Indicator 810 W

waterproof and oilproof

- Design features identical to 810, but upper protective cap on measuring spindle as well as bezel and transparent dial cover with O-rings hermetically sealed
- Measuring spindle sealed by means of rubber sleeve, thus preventing contamination by liquids and impurities
- Delivered in plastic case

## Technical Data

|       | Range     | Readings | Dial dia. | Overtravel | Measuring force | Accuracy (DIN 878)     |                            |                        | Order no. |
|-------|-----------|----------|-----------|------------|-----------------|------------------------|----------------------------|------------------------|-----------|
|       | mm        | mm       | mm        | mm         | N               | $f_e$<br>$\mu\text{m}$ | $f_{ges}$<br>$\mu\text{m}$ | $f_u$<br>$\mu\text{m}$ |           |
| 803   | 3         | 0,01     | 35        | 0,2        | 1,1 N           | 10                     | 12                         | 3                      | 4324110   |
| 803 W | 3         | 0,01     | 35        | 0,2        | 1,1 N           | 10                     | 12                         | 3                      | 4326100   |
| 810   | 10        | 0,01     | 50        | 1,1        | 1,0 N           | 15                     | 17                         | 3                      | 4311110   |
| 810 L | 10        | 0,01     | 50        | 1,1        | 1,0 N           | 15                     | 17                         | 3                      | 4327110   |
| 810 W | 10        | 0,01     | 50        | 1,1        | 1,0 N           | 15                     | 17                         | 3                      | 4315100   |
| 810 B | 0,8(±0,4) | 0,01     | 50        | 0,05       | 1,0 N           | 7                      | 9                          | 3                      | 4317110   |

|       | Range | Readings | Dial dia. | Overtravel | Measuring force | Accuracy (DIN 878) |                   |               | Order no. |
|-------|-------|----------|-----------|------------|-----------------|--------------------|-------------------|---------------|-----------|
|       | inch  | inch     | inch      | inch       | N               | $f_e$<br>inch      | $f_{ges}$<br>inch | $f_u$<br>inch |           |
| 803 Z | .120" | .0005"   | 1.4"      | .008"      | 1,1 N           | .0004"             | .0005"            | .00012"       | 4324911   |
| 810 Z | .400" | .0005"   | 2.0"      | .040"      | 1,0 N           | .0006"             | .0007"            | .00012"       | 4311911   |

**Dial Indicators** shockproof version according to DIN 878



810 B



803 Z



810 Z

## Features

**Dial Indicator 810 B**  
with limited measuring range

Design features identical to 810, but

- Limited measuring range (0,8 mm) for error-free readings

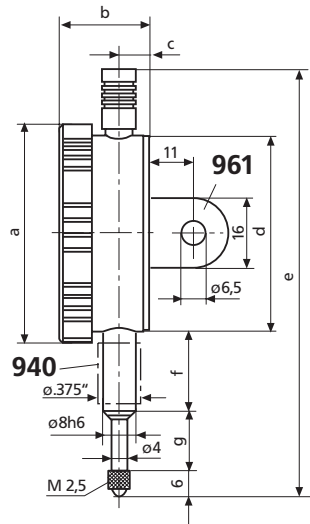
- Large overtravel (10 mm); for example for easier insertion of test items in measuring devices
- Standard accessory: Plastic case

| Dimensions<br>mm | a    | b    | c   | d    | e   | f    | g    |
|------------------|------|------|-----|------|-----|------|------|
| 803              | ø 40 | 21   | 7   | ø 37 | 74  | 13,5 | 6    |
| 803 W            | ø 44 | 21,5 | 7   | ø 37 | 80  | 15   | 11   |
| 810              | ø 58 | 23   | 7,5 | ø 53 | 112 | 21   | 15,5 |
| 810 L            | ø 58 | 23   | 7,5 | ø 53 | 112 | 21   | 15,5 |
| 810 W            | ø 60 | 24   | 7,5 | ø 53 | 118 | 16,5 | 22,5 |
| 810 B            | ø 58 | 23   | 7,5 | ø 53 | 112 | 21   | 15,5 |
| 803 Z            | ø 40 | 21   | 7   | ø 37 | 74  | 13,5 | 6    |
| 810 Z            | ø 58 | 23   | 7,5 | ø 53 | 112 | 21   | 15,5 |

**Small Dial Indicator 803 Z**  
inch version

Design features identical to 803, but

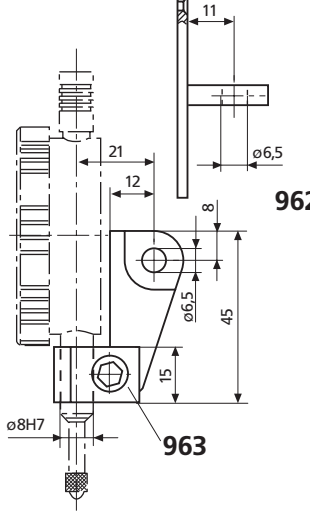
- Standard accessories: Adapter Bush 940 for adapting mounting shank 8h6 mm to inch bore .375", plastic case



**Dial Indicator 810 Z**  
inch version

Design features identical to 810, but

- Standard accessories: Adapter Bush 940 for adapting mounting shank 8h6 mm to inch bore .375", plastic case



## Accessories

|                                                                                         | Order no. |         |
|-----------------------------------------------------------------------------------------|-----------|---------|
| Adapter Bush for adapting mounting shank 8h6 mm to inch bore .375"                      | 940       | 4310103 |
| Cable Release for lifting of measuring spindle (except 803, 803 Z, 803 W, 810 U, 810 V) | 951       | 4372000 |
| Splash Guard Covers for bezel dia. 58 mm                                                | 955       | 4373020 |
| for bezel dia. 40 mm                                                                    | 956       | 4373021 |

|                                                                          | Order no. |         |
|--------------------------------------------------------------------------|-----------|---------|
| Mounting Lugs for 810 L, 810 V                                           |           |         |
| Bore is perpendicular to mounting shank                                  | 961       | 4375010 |
| Bore is parallel to mounting shank                                       | 962       | 4375011 |
| Mounting Lug for mounting on mounting shank for all types (except 810 V) | 963       | 4375002 |
| Additional Accessories                                                   |           | page    |
| Contact Points                                                           | 901-913   | 3-24    |
| Special Holders                                                          | 941       | 3-25    |
| Sensor Level                                                             | 943       | 3-25    |

## Dial Indicators shockproof version



810 U



810 X



810 V

## Features

### Dial Indicator 810 U with reverse measuring force

Design features identical to 810, but

- Numerals on dial increase anti-clockwise
- Measuring force acting towards the top
- Delivered in plastic case

### Dial Indicator 810 X readings 0,1 mm

Design features identical to 810, but

- 1 pointer movement on 10 mm
- Delivered in plastic case

### Long-Range Dial Indicator 810 V with extra-large measuring range

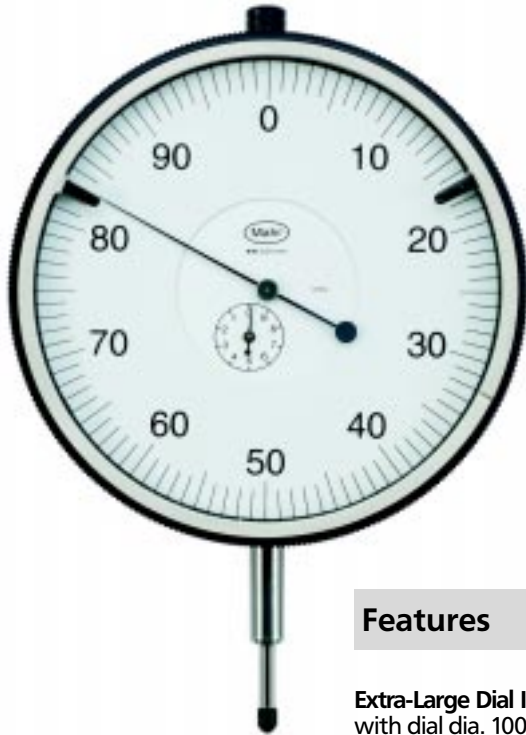
Design features identical to 810, but

- 40 mm range
- Strengthened measuring spindle (5 mm)
- Raising of measuring spindle via lifting cap
- Shockproof movement
- Delivered in folded box

## Technical Data

|       | Range<br>mm | Readings<br>mm | Dial dia.<br>mm | Overtravel<br>mm | Measuring force<br>N | $f_e$<br>$\mu\text{m}$ | Accuracy<br>$f_{ges}$<br>$\mu\text{m}$ | $f_u$<br>$\mu\text{m}$ | Order no. |
|-------|-------------|----------------|-----------------|------------------|----------------------|------------------------|----------------------------------------|------------------------|-----------|
| 810 U | 10          | 0,01           | 50              | 1,1              | 1                    | 15                     | 17                                     | 5                      | 4329110   |
| 810 V | 40          | 0,01           | 50              | 0,3              | 0,75-1,5             | 25                     | 30                                     | 6                      | 4321110   |
| 810 X | 10          | 0,1            | 50              | 0,5              | 1                    | 40                     | 55                                     | 15                     | 4331110   |
| 810 G | 10          | 0,01           | 100             | 1,1              | 1,3                  | 15                     | 17                                     | 5                      | 4322100   |

## Dial Indicators shockproof version



### Features

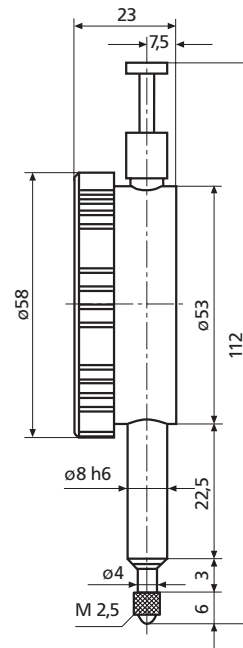
**Extra-Large Dial Indicator 810 G**  
with dial dia. 100 mm

Design features identical to  
810, but

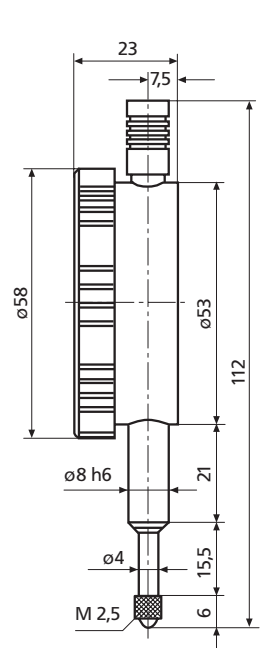
- Application for large reading distance and bad light conditions
- Plastic outer ring
- Delivered in folded box

### Dimensions

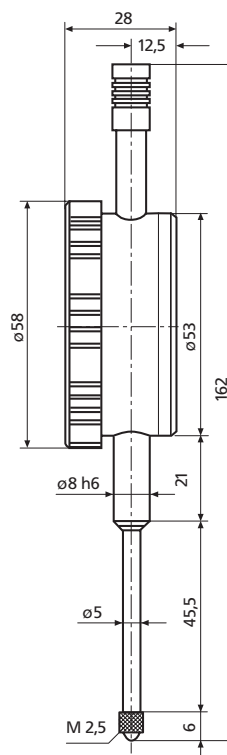
**810 U**



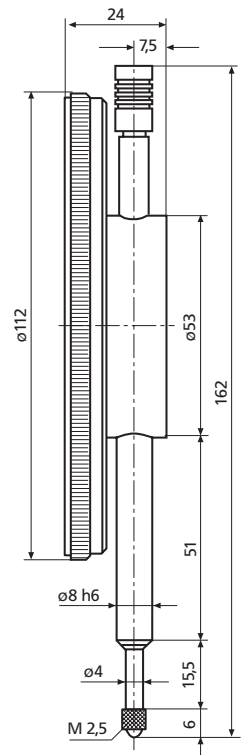
**810 X**



**810 V**



**810 G**



### Accessories

|                                                                                                | Order no. |         |
|------------------------------------------------------------------------------------------------|-----------|---------|
| <b>Adapter Bush</b> for adapting mounting shank 8h6 mm to inch bore .375"                      | 940       | 4310103 |
| <b>Cable Release</b> for lifting of measuring spindle (except 803, 803 Z, 803 W, 810 U, 810 V) | 951       | 4372000 |
| <b>Splash Guard Cover</b> for bezel dia. 58 mm                                                 | 955       | 4373020 |
| <b>Mounting Lugs</b> for 810 L, 810 V                                                          |           |         |
| Bore is perpendicular to mounting shank                                                        | 961       | 4375010 |
| Bore is parallel to mounting shank                                                             | 962       | 4375011 |
| <b>Mounting Lug</b> for mounting on mounting shank for all types (except 810 V)                | 963       | 4375002 |

| Additional Accessories | page    |      |
|------------------------|---------|------|
| <b>Contact Points</b>  | 901-913 | 3-24 |
| <b>Special Holders</b> | 941     | 3-25 |
| <b>Sensor Lever</b>    | 943     | 3-25 |

## Digital Dial Indicators 1083/1085 Millitast

### Features

#### Millitast 1083

- Functions:
  - ON/OFF
  - RESET (zero setting of display)
  - PRESET (set buttons can be used to enter any numerical value)
  - mm/inch-switching
  - DATA (data transmission in connection with data connection cable)
  - HOLD (storage of current measuring value)
  - mm/inch-switch
  - Reversal of counting direction
  - Switching of analog display
- Capacitive measuring system, life of battery approx. 2 years
- Max. measuring speed 1,5 m/s (60"/s)
- Data output: OPTO RS232C (Mahr Duplex)
- Dial indicator can be operated by remote control via interface
- High-contrast 6,5 mm liquid crystal display, analog display with 4 mm pointer length for better visual perception when checking roundness or flatness as well as reversal point search when measuring bores
- Function and display section can be rotated through 280°
- Class of protection IP 52 as per IEC 529
- Operating temperature 5 - 40° C
- Standard accessory: Battery

#### Millitast 1085

- Design features identical to 1083, but additional functions:
- 3 x PRESET can be stored
  - 2 additional analog displays
  - MAX / MIN memory, for example for reversal point search
  - MAX-MIN for example for checking of roundness and flatness
  - ABS: zero setting does not cause reference to current PRESET value to be lost
  - LOCK: buttons can be locked to avoid inadvertent adjustment
  - Standard accessory: Battery

### Technical Data

|             | Range<br>mm (inch) | Resolution<br>mm/inch | Span of error f <sub>e</sub><br>mm (inch) | Measuring force<br>N | Weight<br>g | Order no.      |
|-------------|--------------------|-----------------------|-------------------------------------------|----------------------|-------------|----------------|
| <b>1083</b> | 12,5 (.5")         | 0,001 / .00005"       | 0,005 (.0002")                            | 0,7-0,95             | 160         | <b>4336800</b> |
|             | 25 (1")            | 0,001 / .00005"       | 0,005 (.0002")                            | 0,6-1,1              | 160         | <b>4336801</b> |
| <b>1085</b> | 12,5 (.5")         | 0,001 / .00005"       | 0,005 (.0002")                            | 0,7-0,95             | 160         | <b>4336301</b> |
|             | 25 (1")            | 0,001 / .00005"       | 0,005 (.0002")                            | 0,6-1,1              | 160         | <b>4336300</b> |

#### Analog display 1083

Readings  
mm / inch

Display range  
mm (inch)

|                 |                   |
|-----------------|-------------------|
| 0,001 / .00005" | ± 0,03 (± .0015") |
| 0,01 / .0005"   | ± 0,30 (± .0150") |



#### Analog display 1085

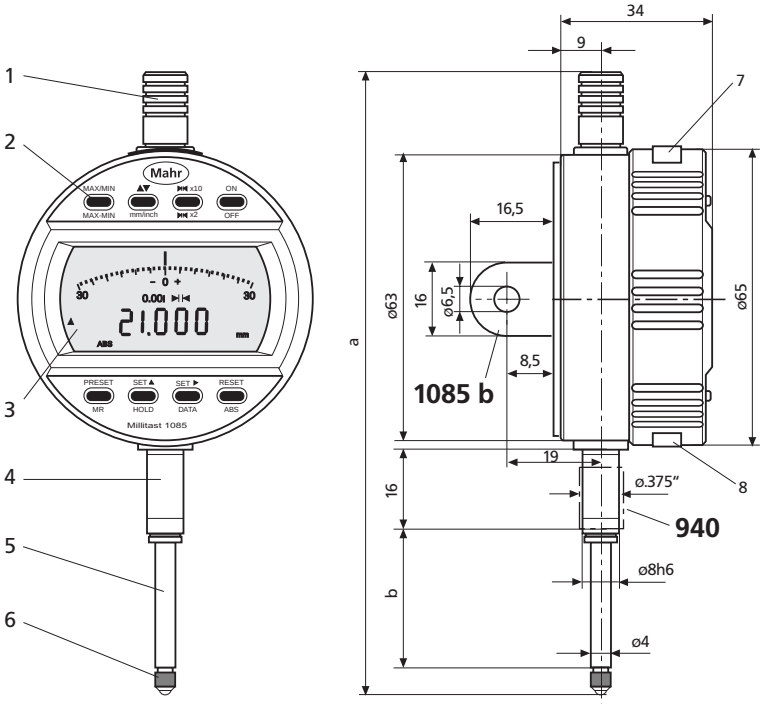
Readings  
mm (inch)

Display range  
mm (inch)

|                 |                   |
|-----------------|-------------------|
| 0,001 (.00005") | ± 0,03 (± .0015") |
| 0,002 (.0001")  | ± 0,06 (± .0030") |
| 0,01 (.0005")   | ± 0,30 (± .0150") |
| 0,02 (.001")    | ± 0,60 (± .0300") |

## Digital Dial Indicators 1083/1085 Millitast

- 1 Protective lifting cap for measuring spindle
- 2 Operating buttons
- 3 Display
- 4 Mounting shank
- 5 Measuring spindle
- 6 Contact Point 901
- 7 RS232C-Data output
- 8 Battery compartment
- 9 Swivelling operating and display unit

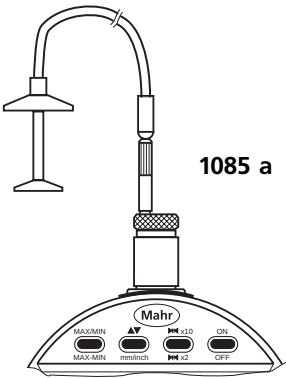


| Dimensions (mm) |                | a     | b    |
|-----------------|----------------|-------|------|
| 1083 / 1085     | 12,5 mm ( .5") | 125,5 | 19   |
| 1083 / 1085     | 25 mm ( 1")    | 138   | 31,5 |

### Accessories

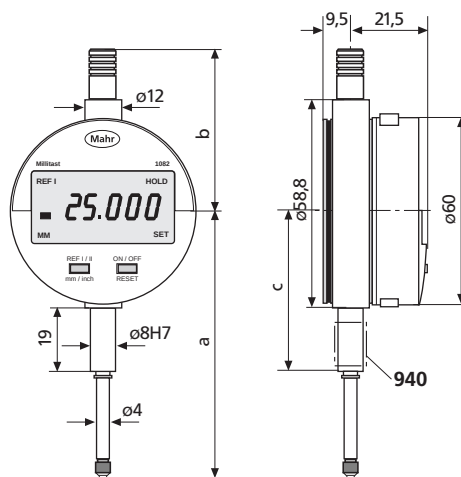
|                                                                         | Order no.      |
|-------------------------------------------------------------------------|----------------|
| Battery 3V, type CR 2450                                                | 4884464        |
| Data Connecting Cable RS232C (2m)                                       |                |
| for connection to PC, SUB-D-jack 9-pin                                  | 1085 v 4336305 |
| Data Connecting Cable RS 232C (2m)                                      |                |
| for connection to peripheral units                                      |                |
| RS232C SUB-D-jack 9-pin                                                 | 16 ESv 4102510 |
| Cable Release                                                           | 1085 a 4336311 |
| Mounting Lug                                                            | 1085 b 4336310 |
| Adapter Bush for adapting mounting shank dia. 8h6 mm to inch bore .375" | 940 4310103    |

| Additional Accessories |         | page |
|------------------------|---------|------|
| Contact Points         | 901-913 | 3-24 |
| Special Holder         | 941     | 3-25 |
| Sensor Lever           | 943     | 3-25 |



Accessories for data processing see chapter 9

## Digital Dial Indicator 1082



| Dimensions<br>mm | a     | b    | c     |
|------------------|-------|------|-------|
| 12,5 mm ( .5")   | 65,9  | 53,4 | 50    |
| 25 mm ( 1")      | 78,4  | 53,4 | 50    |
| 50 mm ( 2")      | 150,5 | 124  | 99,5  |
| 100 mm ( 4")     | 250,5 | 174  | 149,5 |

### Features

- Functions:
  - ON/OFF
  - RESET (zero setting)
  - PRESET (set buttons can be used to enter any numerical value)
  - mm/inch-switch
  - DATA (data transmission)
  - HOLD (storage of current measuring value)
- Capacitive measuring system, life of battery approx. 2 years
- Max. measuring speed 1,5 m/s (60"/s)
- Data output: OPTO RS232C
- High-contrast 8,5 mm liquid crystal display
- Function and display section can be rotated through 280°
- Class of protection IP 51 as per IEC 529
- Operating temperature 5 - 40°C
- Standard accessory: Battery

### Technical Data

| Range      | Resolution      | Span of error f <sub>p</sub> | Measuring force | Weight | Order no.      |
|------------|-----------------|------------------------------|-----------------|--------|----------------|
| mm (inch)  | mm/inch         | mm (inch)                    | N               | g      |                |
| 25 (1")    | 0,01 / .0005"   | 0,01 (.0004")                | 0,6 - 1,1       | 220    | <b>4336206</b> |
| 50 (2")    | 0,01 / .0005"   | 0,02 (.0008")                | 2,0 - 3,0       | 400    | <b>4336207</b> |
| 100 (4")   | 0,01 / .0005"   | 0,02 (.0008")                | 2,3 - 4,0       | 600    | <b>4336208</b> |
| 12,5 (.5") | 0,001 / .00005" | 0,005 (.0002")               | 0,7 - 0,95      | 220    | <b>4336201</b> |
| 25 (1")    | 0,001 / .00005" | 0,005 (.0002")               | 0,6 - 1,1       | 220    | <b>4336200</b> |
| 50 (2")    | 0,001 / .00005" | 0,012 (.0005")               | 2,0 - 3,0       | 430    | <b>4336202</b> |
| 100 (4")   | 0,001 / .00005" | 0,015 (.0006")               | 2,3 - 4,0       | 620    | <b>4336203</b> |

### Accessories

|                                                                                       | Order no.             |
|---------------------------------------------------------------------------------------|-----------------------|
| Battery 3V, type CR 2032                                                              | <b>4102520</b>        |
| Data Connecting Cable (2m), for connection to peripheral units, with SUB-D jack 9-pin | <b>16 ESv 4102510</b> |
| Cable Release for range 12,5 and 25 mm                                                | <b>1085 a 4336311</b> |
| Pneumatic Lifting for range 50 and 100 mm                                             | <b>1082 p 4336230</b> |
| Mounting Lug                                                                          | <b>1082 b 4336313</b> |
| Adapter Bush for adapting mounting shank 8h6 mm to inch bore .375"                    | <b>940 4310103</b>    |

### Additional Accessories

|                                 | page                |
|---------------------------------|---------------------|
| Contact Points                  | <b>901-913</b> 3-24 |
| Special Holders                 | <b>941</b> 3-25     |
| Sensor Lever                    | <b>943</b> 3-25     |
|                                 | chapter             |
| Accessories for data processing | <b>9</b>            |

## Design features of Mahr dial comparators

- Constant measuring force over entire range due to built-in compression spring



- Corrosion-proof by virtue of hardened, stainless steel mounting shank and measuring spindle

- Protection of ball guide against contamination by means of a sleeve seal ring which is provided with a groove for mounting slip-on rubber bellows to prevent the ingress of splashwater

- Drip-proof version available on request. Features rubber bellows at measuring spindle, sealed screws and splash guard cover

- Measuring spindle mounted in high-precision ball guide prevents tilting and virtually precludes friction and play. The extremely low level of friction makes for high measurement accuracy and minimal hysteresis

- Dial comparators with ball guide are particularly insensitive to lateral forces acting on the spindle (Dial Comparators 1010 and 1050 feature high-precision sleeve bearings for the spindle)

- Shockproof movement. The precision ball of the first transmission lever rest on the lapped sapphire plane surface of the upper end of the measuring spindle. If the spindle is subject to severe impact, the plane surface is automatically raised, thus preventing transmission of the shock to the movement

- Box-type housing only open at the front

- Bottom and side walls made of one piece. This shell totally encloses the movement and provides maximum protection against shock and damage

- Simple fine adjustment by way of lockable screw

- Self-contained movement. This unit can be removed and replaced quickly and easily for repair or maintenance purposes



- Maximum sensitivity and accuracy are ensured by jewelled bearings of movement in conjunction with precision gears and pinions



- Easy to read due to clear-cut scale

- Pointer moves over limited sector

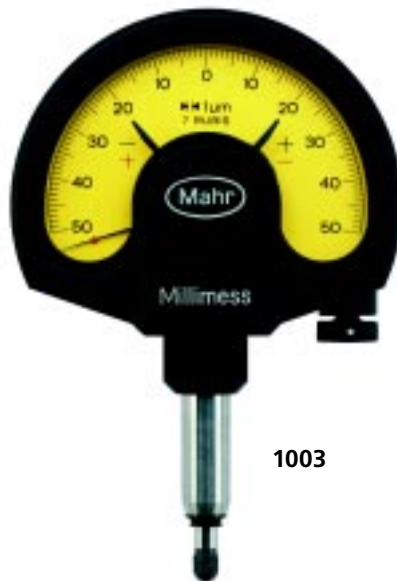
- Adjustable tolerance markers facilitate setting and observation of tolerance limits

- Raising of measuring spindle either by way of screw-in cable or lifting knob

## Mechanical Dial Comparators



1002



1003



1004

## Technical Data

| Metric            | Measuring range       | Readings          | Over-travel | Meas. force | Accuracy* (DIN 879-1) |                   |                    | Order no. standard** | Order no. drip-proof*** |
|-------------------|-----------------------|-------------------|-------------|-------------|-----------------------|-------------------|--------------------|----------------------|-------------------------|
|                   |                       |                   |             |             | $f_e$                 | $f_{ges}$         | $f_u$              |                      |                         |
| 1002 Supramess    | $\pm 25 \mu\text{m}$  | $0,5 \mu\text{m}$ | 2,8 mm      | 1 N         | $0,5 \mu\text{m}$     | $0,6 \mu\text{m}$ | $0,25 \mu\text{m}$ | 4335000              | 4335005                 |
| 1003 Millimes     | $\pm 50 \mu\text{m}$  | $1 \mu\text{m}$   | 2,8 mm      | 1 N         | $1 \mu\text{m}$       | $1,2 \mu\text{m}$ | $0,5 \mu\text{m}$  | 4334000              | 4334005                 |
| 1004 Compramess   | $\pm 0,13 \text{ mm}$ | $5 \mu\text{m}$   | 2,5 mm      | 1 N         | $3,5 \mu\text{m}$     | $4 \mu\text{m}$   | $1 \mu\text{m}$    | 4333000              | 4333005                 |
| 1010 Zentimes     | $\pm 0,25 \text{ mm}$ | $0,01 \text{ mm}$ | 2,5 mm      | 1 N         | $7 \mu\text{m}$       | $8 \mu\text{m}$   | $2 \mu\text{m}$    | 4332000              | 4332005                 |
| 1050 Dezimes      | $\pm 1,5 \text{ mm}$  | $0,05 \text{ mm}$ | 0,3 mm      | 1 N         | $35 \mu\text{m}$      | $40 \mu\text{m}$  | $10 \mu\text{m}$   | 4330000              | 4330005                 |
| Inch              |                       |                   |             |             |                       |                   |                    |                      |                         |
| 1002 Z Supramess  | $\pm .0010''$         | $.00002''$        | .11"        | 1 N         | $.00002''$            | $.000025''$       | $.00001''$         | 4335900              | 4335905                 |
| 1003 Z Millimes   | $\pm .0020''$         | $.00005''$        | .11"        | 1 N         | $.00005''$            | $.00006''$        | $.000025''$        | 4334900              | 4334905                 |
| 1004 Z Compramess | $\pm .0050''$         | $.0001''$         | .10"        | 1 N         | $.0001''$             | $.00012''$        | $.00003''$         | 4333900              | 4333905                 |
| 1010 Z Zentimes   | $\pm .0100''$         | $.0005''$         | .10"        | 1 N         | $.00035''$            | $.0004''$         | $.0001''$          | 4332900              | 4332905                 |

\* Accuracy of 1004, 1010, 1010 Z, 1050 better than DIN 879-1

\*\* Incl. plastic case; Adapter 940 (for inch instruments only)

\*\*\* Incl. plastic case, Splash Guard Cover 957, rubber bellows (only 1002/1003/1004); Adapter 940 (for inch instruments only)

## Mechanical Dial Comparators

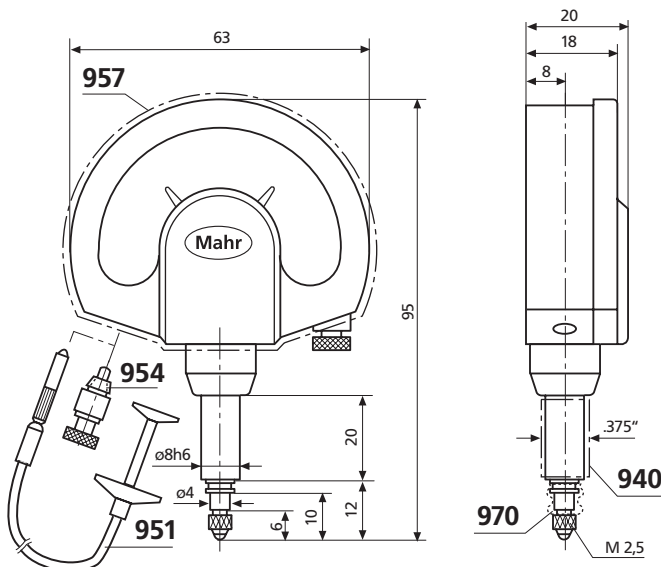


1010

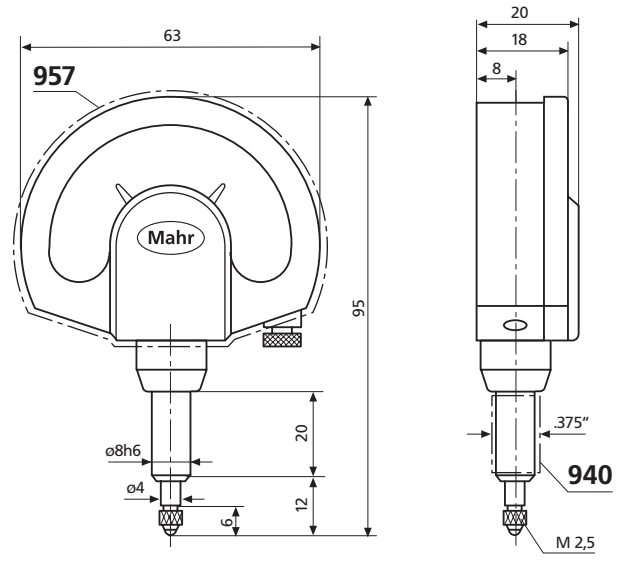


1050

1002/1003/1004



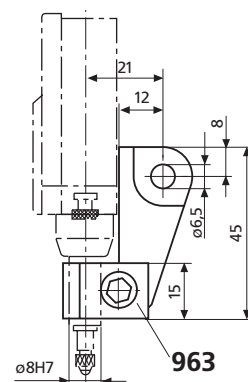
1010/1050



## Accessories

|                                                                                   | Order no. |         |
|-----------------------------------------------------------------------------------|-----------|---------|
| <b>Adapter Bush</b> for adapting mounting shank 8h6 mm to inch bore .375"         | 940       | 4310103 |
| <b>Cable Release</b> for lifting of measuring spindle                             | 951       | 4372000 |
| <b>Lifting Knob</b> for raising measuring spindle                                 | 954       | 4372030 |
| <b>Splash Guard Cover</b>                                                         | 957       | 4373030 |
| <b>Rubber Bellow</b> for 1002/1003/1004 for sealing open end of measuring spindle | 970       | 4334786 |
| <b>Mounting Lug</b> for mounting on mounting shank 8h6 mm                         | 963       | 4375002 |

| Additional Accessories | page    |        |
|------------------------|---------|--------|
| Contact Points         | 901-913 | 3 - 24 |
| Special Holders        | 941     | 3 - 25 |
| Sensor Lever           | 943     | 3 - 25 |



## Mechanical Dial Comparators with limit contacts



1103 N



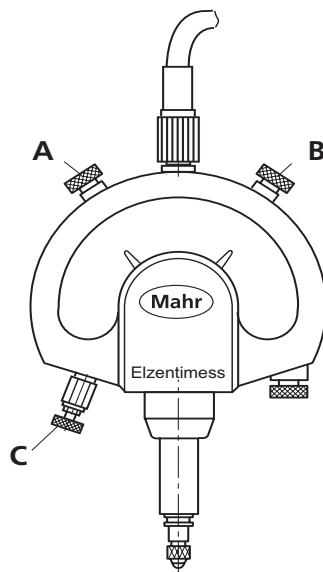
1110 N



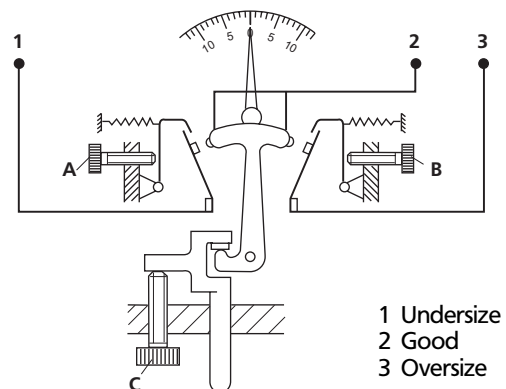
1150 N

### Features

- Application for example for tolerance control or as precision contactor in automatic control systems
- Design features identical to mechanical dial comparators, but additional adjustable limit contacts made of high-grade precious metal
- Limit contacts particularly well protected against vibration and mechanical wear



### Wiring diagram



### Technical Data

| Metric               | Measuring range       | Readings          | Over-travel | Meas. force | Accuracy* (DIN 879-3) |                   |                   | Order no. standard** | Order no. drip-proof*** |
|----------------------|-----------------------|-------------------|-------------|-------------|-----------------------|-------------------|-------------------|----------------------|-------------------------|
|                      |                       |                   |             |             | $f_e$                 | $f_{ges}$         | $f_u$             |                      |                         |
| 1103 N Elmillimess   | $\pm 50 \mu\text{m}$  | $1 \mu\text{m}$   | 2,8 mm      | 2 N         | $1 \mu\text{m}$       | $1,8 \mu\text{m}$ | $1 \mu\text{m}$   | 4345100              | 4345105                 |
| 1104 N Elcompramess  | $\pm 0,13 \text{ mm}$ | $5 \mu\text{m}$   | 2,5 mm      | 2 N         | $3,5 \mu\text{m}$     | $6 \mu\text{m}$   | $1,7 \mu\text{m}$ | 4344100              | 4344105                 |
| 1110 N Elzentimess   | $\pm 0,25 \text{ mm}$ | $0,01 \text{ mm}$ | 2,3 mm      | 2 N         | $6,5 \mu\text{m}$     | $12 \mu\text{m}$  | $3,5 \mu\text{m}$ | 4343100              | 4343105                 |
| 1150 N Eldezimess    | $\pm 1,5 \text{ mm}$  | $0,05 \text{ mm}$ | 0,3 mm      | 1,5 N       | $35 \mu\text{m}$      | $60 \mu\text{m}$  | $17 \mu\text{m}$  | 4342100              | 4342105                 |
| <b>Inch</b>          |                       |                   |             |             |                       |                   |                   |                      |                         |
| 1103 NZ Elmillimess  | $\pm .0020''$         | $.00005''$        | .11"        | 2 N         | $.00005''$            | $.00009''$        | $.00005''$        | 4345910              | 4345915                 |
| 1104 NZ Elcompramess | $\pm .0050''$         | $.0001''$         | .10"        | 2 N         | $.0001''$             | $.00018''$        | $.00005''$        | 4344910              | 4344915                 |
| 1110 NZ Elzentimess  | $\pm .0100''$         | $.0005''$         | .10"        | 2 N         | $.00035''$            | $.0006''$         | $.00017''$        | 4343910              | 4343915                 |

\* Accuracy of 1104 N, 1110 N and 1150 N better than DIN 879

\*\* Incl. plastic case, Setting Knob 953, cable (1,2m); Adapter 940 (for inch instruments only)

\*\*\* Incl. plastic case, Setting Knob 953, cable (1,2m), Splash Guard Cover 958 and Rubber Bellow 970; Adapter 940 (for inch instruments only)

## Mechanical Dial Comparators with limit contacts

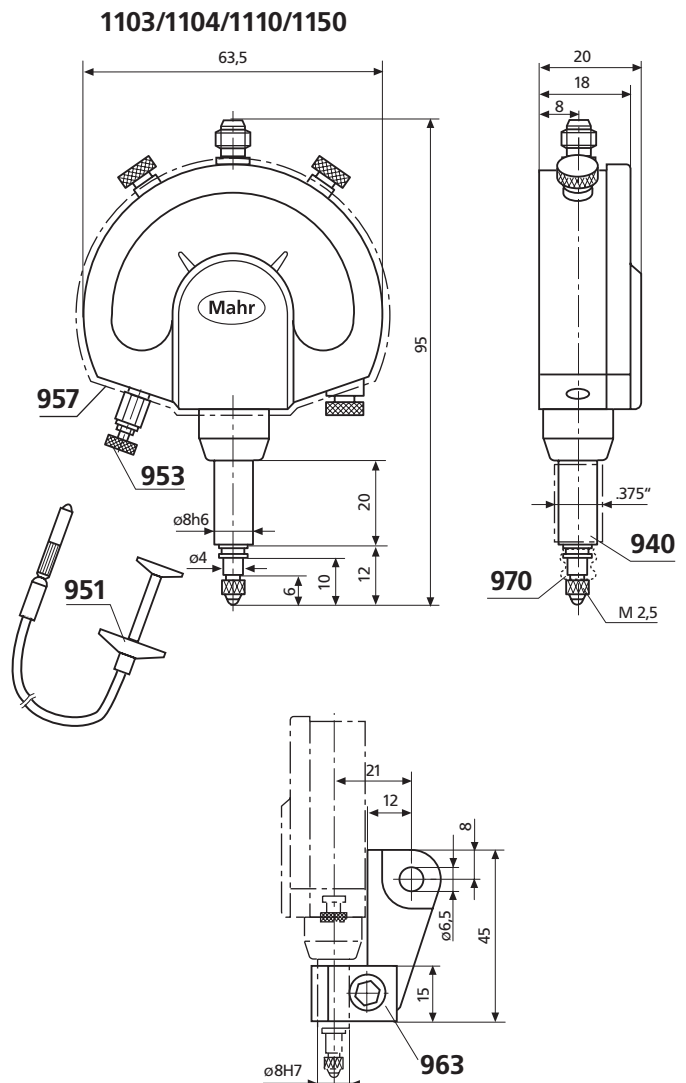
### Electrical specifications

|        | Switching accuracy<br>with non-inductive<br>load of 10 mA/24 V | max.<br>contact rating | max.<br>contact voltage | max.<br>contact current |
|--------|----------------------------------------------------------------|------------------------|-------------------------|-------------------------|
| 1103 N | +/- 0,3 $\mu\text{m}$                                          | 240 mW                 | 24 V                    | 100 mA                  |
| 1104 N | +/- 0,75 $\mu\text{m}$                                         |                        |                         |                         |
| 1110 N | +/- 1,5 $\mu\text{m}$                                          |                        |                         |                         |
| 1150 N | +/- 7 $\mu\text{m}$                                            |                        |                         |                         |

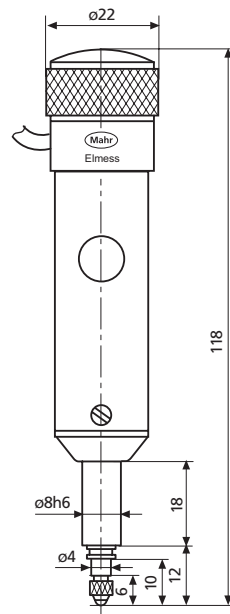
### Accessories

|                                                                                      | Order no.   |
|--------------------------------------------------------------------------------------|-------------|
| Connecting cable (1,2 m), axial                                                      | 4345695     |
| Connecting cable (5 m), axial                                                        | 4345694     |
| Adapter Bush for adapting<br>mounting shank 8h6 mm to<br>inch bore .375"             | 940 4310103 |
| Cable Release for lifting of<br>measuring spindle                                    | 951 4372000 |
| Setting Knob for setting of<br>limit contacts without<br>additional setting standard | 953 4372020 |
| Lifting Knob for raising<br>measuring spindle                                        | 954 4372030 |
| Splash Guard Cover                                                                   | 958 4373031 |
| Rubber Bellow for sealing open<br>end of measuring spindle                           | 970 4334786 |
| Mounting Lug for mounting<br>on mounting shank 8h6 mm                                | 963 4375002 |

| Additional accessories | page         |
|------------------------|--------------|
| Contact Points         | 901-913 3-24 |
| Special Holders        | 941 3-25     |
| Sensor Lever           | 943 3-25     |
| Electrical Indicator   | 1141 SN 3-20 |



## Mechanical Dial Comparator 1100 with limit contacts



Elmess 1100

### Features

- Identical to comparators with limit contacts, but without analog display
- Ideal for applications where available space is limited

### Electrical specifications

|                                                          |            |
|----------------------------------------------------------|------------|
| Switching accuracy with non-inductive load of 10 mA/24 V | +/- 0,3 µm |
| max. contact rating                                      | 240 mW     |
| max. contact voltage                                     | 24 V       |
| max. contact current                                     | 100 mA     |

### Technical Data

|      | Range    | Overtravel | Measuring force | Order no. |
|------|----------|------------|-----------------|-----------|
| 1100 | ± 0,4 mm | 2 mm       | 1,5 N           | 4340000   |

## Electrical Indicator 1141 SN for dial comparators and comparators with limit contacts



### Features

- For dial comparators with limit contacts
- Indicates no-go (red), go (green) and no-go re-work (yellow). Lamp sequence can be switched for outside and inside measurement
- Test results can be processed via control output
- Standard accessory: Mains adapter

### Technical Data

|                                    |              |  |         |
|------------------------------------|--------------|--|---------|
| Housing dimensions WxHxD           | 82x52x150 mm |  |         |
| Contact voltage at dial comparator | 6 V          |  |         |
| Maximum contact rating             | 60 W         |  |         |
| Maximum contact voltage            | 48 V         |  |         |
| Maximum contact current            | 3 A          |  |         |
| Power pack connections             | 5 V 250 mA   |  |         |
| Mains voltage                      | 230 V        |  | 115 V   |
| Order no.                          | 4352300      |  | 4352310 |

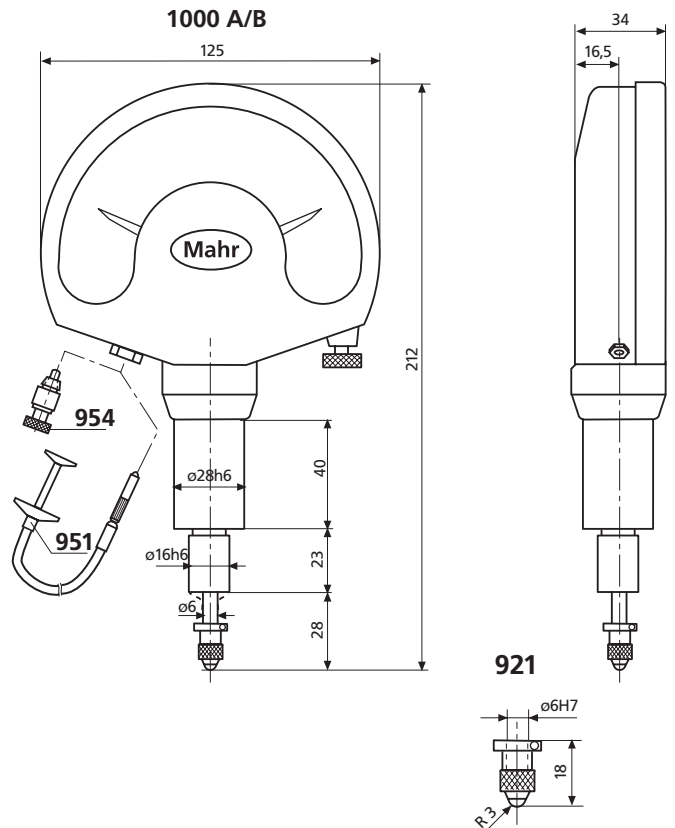
# Dial Comparators

**Mahr**

## Mechanical Dial Comparator Large Type Millimess



1000 A



### Features

- Large design
- Clear dial
- Shockproof movement
- Jewelled movement bearings
- Measuring spindle mounted in high-precision ball guides precludes play
- Standard accessories: Cable Release 951 and plastic case

### Accessories

|                                                                |       | Order no. |
|----------------------------------------------------------------|-------|-----------|
| <b>Measuring Attachments</b>                                   |       |           |
| with steel ball                                                | 921   | 4362001   |
| with ruby ball                                                 | 921 R | 4362002   |
| <b>Cable Release</b>                                           |       |           |
| for raising measuring spindle                                  | 951   | 4372000   |
| <b>Lifting Knob</b>                                            |       |           |
| for raising measuring spindle                                  | 954   | 4372030   |
| <b>Rubber Bellow</b> for sealing open end of measuring spindle |       | 4338008   |

| Additional Accessories |        | page |
|------------------------|--------|------|
| Precision Stand        | 824 GT | 5-8  |

### Technical Data

| Metric      | Range                 | Readings        | Scale division | Over-travel | Measuring force | $f_e$             | Accuracy $f_u$  | $f_{ges}$       | Order no. |
|-------------|-----------------------|-----------------|----------------|-------------|-----------------|-------------------|-----------------|-----------------|-----------|
| 1000 A      | $\pm 100 \mu\text{m}$ | $1 \mu\text{m}$ | 1 mm           | 5 mm        | 3,5 N           | $1,5 \mu\text{m}$ | $1 \mu\text{m}$ | $2 \mu\text{m}$ | 4338000   |
| 1000 B      | $\pm 50 \mu\text{m}$  | $1 \mu\text{m}$ | 2 mm           | 5 mm        | 3,5 N           | $1,5 \mu\text{m}$ | $1 \mu\text{m}$ | $2 \mu\text{m}$ | 4339000   |
| <b>Inch</b> |                       |                 |                |             |                 |                   |                 |                 |           |
| 1000 Z      | $\pm .0020''$         | .00005"         | .08"           | .2"         | 3,5 N           | .000075"          | .00005"         | .0001"          | 4339900   |

## Inductive Dial Comparator 2000 Extramess



### Features

#### Extramess 2000

- Functions:
  - ON/OFF
  - RESET (zero setting of digital and analog display)
  - 0 - (zero setting of analog display)
  - PRESET (set buttons can be used to enter any numerical value)
  - mm/inch switching
  - Reversal of counting direction
  - RANGE (switching of measuring range and readings)
  - ABS (reference to elect. zero point)
  - Display of battery status
- Linearized inductive measuring system
- Power supply via integrated NiMH batteries (40 hours) or via mains adapter
- Data output: alternatively OPTO RS232C or Digimatic
- Dial Comparator can be operated by remote control via interface
- High-contrast 6,5 mm liquid crystal display, analog display with 4 mm pointer length for better visual perception when checking roundness or flatness as well as reversal point search when measuring bores
- Function and display section can be rotated through 280°
- Spring for measuring force interchangeable
- Lower stop adjustable
- Class of protection IP 54 as per IEC 529
- Operating temperature 5 - 40°C
- Standard accessories: Mains adapter, rubber bellow and spanner for preliminary stroke setting

#### Extramess 2001

- Features identical to Extramess 2000, but additional:
- MAX / MIN memory for example for reversal point search
  - MAX-MIN, for example for checking concentricity and flatness
  - TOL (tolerance release)
  - LOCK: buttons can be locked to avoid inadvertent adjustment
  - Control output compatible to dial comparators with limit contacts
  - Standard accessories: Mains adapter, rubber bellow and spanner for preliminary stroke setting

### Technical Data

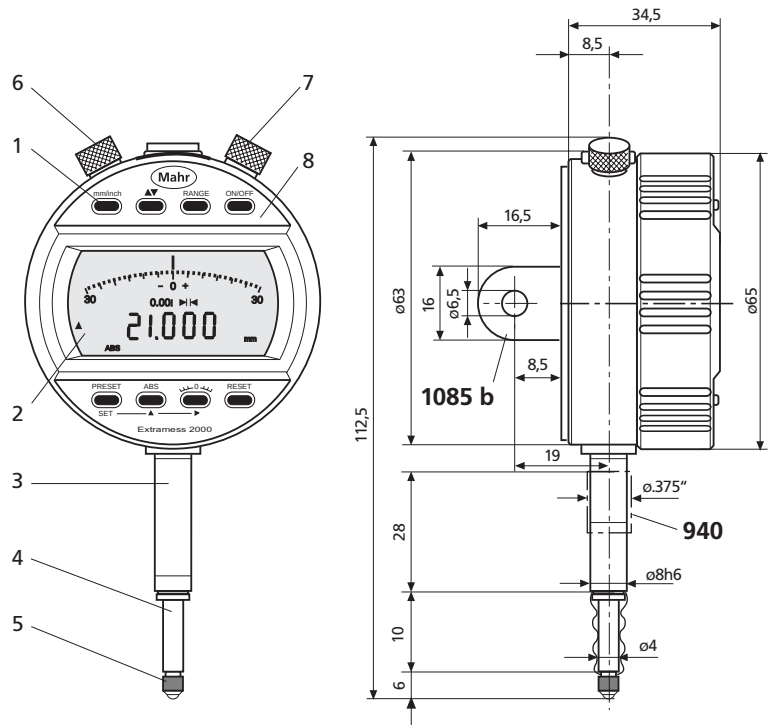
|             | Measuring ranges switchable mm (inch) | Selectable resolution and readings mm/inch | Display range of analog display mm (inch) | Span of error** | Over-travel | Measuring force N | Order no. 230 V | Order no. 115 V |
|-------------|---------------------------------------|--------------------------------------------|-------------------------------------------|-----------------|-------------|-------------------|-----------------|-----------------|
|             |                                       |                                            |                                           | μm (inch)       | mm          |                   |                 |                 |
| <b>2000</b> | 1,8 (.07")                            | 0,001 / .00005"                            | ± 0,030 (.0015")                          | 0,6 (.000025")  | 2,4         | 0,7 - 0,9         | <b>4346000</b>  | <b>4346900*</b> |
|             | 1,8 (.07")                            | 0,0005 / .00002"                           | ± 0,015 (.0006")                          | 0,6 (.000025")  | 2,4         |                   |                 |                 |
|             | 0,8 (.031")                           | 0,0002 / .00001"                           | ± 0,006 (.0003")                          | 0,3 (.000012")  | 2,9         |                   |                 |                 |
| <b>2001</b> | 1,8 (.07")                            | 0,001 / .00005"                            | ± 0,030 (.0015")                          | 0,6 (.000025")  | 2,4         | 0,7 - 0,9         | <b>4346100</b>  | <b>4346910*</b> |
|             | 1,8 (.07")                            | 0,0005 / .00002"                           | ± 0,015 (.0006")                          | 0,6 (.000025")  | 2,4         |                   |                 |                 |
|             | 0,8 (.031")                           | 0,0002 / .00001"                           | ± 0,006 (.0003")                          | 0,3 (.000012")  | 2,9         |                   |                 |                 |

\* including Adapter Bush 940

\*\* indicated value + display span of error ( $\leq 0,5$  resolution)

## Inductive Dial Comparator 2000 Extramess

- 1 Operating buttons
- 2 Display
- 3 Mounting shank
- 4 Measuring spindle
- 5 Contact Point 901H
- 6 Connection for mains adapter
- 7 Data output
- 8 Swivelling operating and display unit

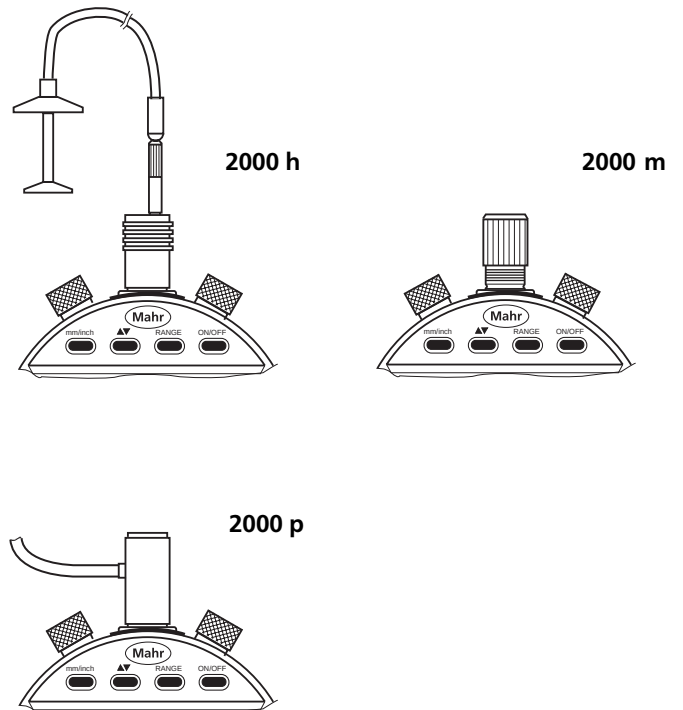


## Accessories

|                                                                                |  |                |
|--------------------------------------------------------------------------------|--|----------------|
| <b>Data connecting cable</b>                                                   |  |                |
| Opto RS232C (2m), SUB-D jack 9-pin                                             |  | <b>4346020</b> |
| <b>Data connecting cable Digimatic (2m),</b>                                   |  |                |
| Flat plug 10-pin                                                               |  | <b>4346021</b> |
| <b>Hand Lifter with cable release</b>                                          |  |                |
| 2000 h                                                                         |  | <b>4346010</b> |
| <b>Pneumatic Lifter</b>                                                        |  |                |
| 2000 p                                                                         |  | <b>4346011</b> |
| <b>Adjuster for measuring force</b>                                            |  |                |
| 2000 m                                                                         |  | <b>4346012</b> |
| <b>Mounting Lug</b>                                                            |  |                |
| 1085 b                                                                         |  | <b>4336310</b> |
| <b>Adapter Bush for adapting mounting shank dia. 8h6 mm to inch bore .375"</b> |  |                |
| 940                                                                            |  | <b>4310103</b> |

|                               |                |             |
|-------------------------------|----------------|-------------|
| <b>Additional Accessories</b> |                | <b>page</b> |
| <b>Contact Points</b>         | <b>901-913</b> | <b>3-24</b> |
| <b>Special Holder</b>         | <b>941</b>     | <b>3-25</b> |

Accessories for data processing see chapter 9

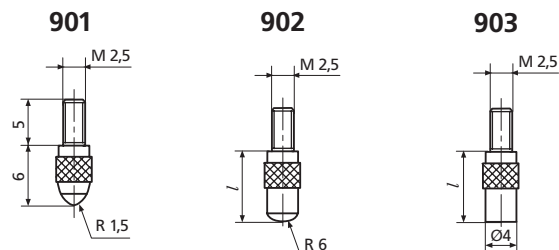


## Contact Points for dial indicators, dial comparators

### Standard Contact Points 901

Ball dia. 3 mm

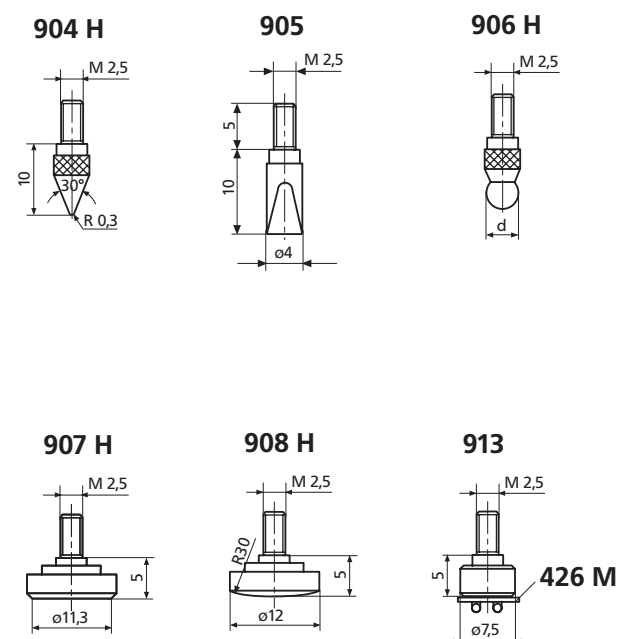
| Cat. No. |              | Order no. |
|----------|--------------|-----------|
| 901      | Steel ball   | 4360001   |
| 901 H    | Carbide ball | 4360002   |
| 901 R    | Ruby ball    | 4360003   |



### Spherical Contact Points 902

### Flat Contact Points 903

| 902<br>made of steel<br>length Order no.<br>mm | 902 H<br>carbide<br>contact face<br>Order no. | 903<br>made of steel<br>Order no. | 903 H<br>carbide-<br>tipped<br>Order no. |
|------------------------------------------------|-----------------------------------------------|-----------------------------------|------------------------------------------|
| 4                                              | 4360007                                       | —                                 | 4360070                                  |
| 6                                              | 4360009                                       | —                                 | 4360071                                  |
| 8                                              | 4360010                                       | 4360040                           | 4360072                                  |
| 10                                             | 4360011                                       | 4360041                           | 4360073                                  |
| 12                                             | 4360012                                       | 4360042                           | 4360074                                  |
| 15                                             | 4360013                                       | 4360043                           | 4360075                                  |
| 20                                             | 4360014                                       | 4360044                           | 4360076                                  |
| 25                                             | 4360015                                       | 4360045                           | 4360077                                  |
| 30                                             | 4360016                                       | 4360046                           | 4360300                                  |
| 35                                             | 4360017                                       | 4360047                           | 4360078                                  |
| 40                                             | 4360019                                       | 4360049                           | 4360310                                  |
| 45                                             | 4360026                                       | 4360050                           | 4360303                                  |
| 50                                             | 4360018                                       | 4360048                           | 4360079                                  |
| 55                                             | 4360031                                       | —                                 | 4360109                                  |
| 65                                             | 4360035                                       | —                                 | —                                        |
| 75                                             | 4360020                                       | —                                 | —                                        |
| 85                                             | 4360036                                       | —                                 | —                                        |
| 95                                             | 4360029                                       | —                                 | —                                        |



### Ball Contact Points 906 H

with carbide ball, accuracy ball dia. 0/-6 µm

| Ball dia. d<br>mm | Order<br>no. | Ball dia. d<br>mm | Order<br>no. |
|-------------------|--------------|-------------------|--------------|
| 1                 | 4360150      | 5,5               | 4360161      |
| 1,25              | 4360151      | 6                 | 4360162      |
| 1,5               | 4360152      | 6,35 (1/4")       | 4360163      |
| 1,75              | 4360153      | 6,5               | 4360164      |
| 2                 | 4360154      | 7                 | 4360165      |
| 2,5               | 4360155      | 7,5               | 4360166      |
| 3                 | 4360156      | 8                 | 4360167      |
| 3,5               | 4360157      | 8,5               | 4360168      |
| 4                 | 4360158      | 9                 | 4360169      |
| 4,5               | 4360159      | 10                | 4360170      |
| 5                 | 4360160      |                   |              |

### Special Contact Points

|                                                                                                               | Order no.     |
|---------------------------------------------------------------------------------------------------------------|---------------|
| Conical Contact Points, made of steel                                                                         | 904 4360130   |
| carbide-tipped                                                                                                | 904 H 4360131 |
| Wedge-Shaped Contact Points, steel                                                                            | 905 4360140   |
| carbide-tipped                                                                                                | 905 H 4360141 |
| Flat Contact Plates, steel, A = 1 cm <sup>2</sup>                                                             | 907 4360200   |
| carbide-tipped, dia. 7 mm                                                                                     | 907 H 4360201 |
| Spherical Contact Plates, made of steel                                                                       | 908 4360210   |
| carbide-tipped                                                                                                | 908 H 4360211 |
| Flat Contact Point for mounting<br>Pin Gauge Holders 426 M for mea-<br>suring threads using three-wire method | 913 4360400   |

## Contact Points for dial indicators, dial comparators

### Contact Rollers 909

Concentricity error 2 µm

|                           |       | Order no. |
|---------------------------|-------|-----------|
| cylindrical roller        | 909 A | 4360220   |
| radiused roller, R = 5 mm | 909 B | 4360221   |

### Measuring Attachment 910 H

|                                           | Order no.     |
|-------------------------------------------|---------------|
| with carbide wedge adjustable in parallel | 910 H 4360230 |

### Pin Contact Point 911 H

|                                 | Order no.     |
|---------------------------------|---------------|
| carbide-tipped, dia. 1 mm, flat | 911 H 4360240 |

### Measuring Spindle Extensions 912

| Length mm | Order no. | length mm | Order no. |
|-----------|-----------|-----------|-----------|
| 10        | 4360 250  | 35        | 4360 254  |
| 15        | 4360 251  | 50        | 4360 255  |
| 20        | 4360 252  | 75        | 4360 256  |
| 25        | 4360 253  | 100       | 4360 257  |

### Special Holders 941

For all types of testing equipment  
For placing the dial indicator at a certain distance or angle  
Measuring spindle travel 3 mm  
Contact Point 901 (interchangeable)

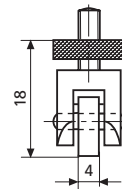
| Straight Holder 941 G        |           | Angular Holder 941 W              |                                   |                                   |
|------------------------------|-----------|-----------------------------------|-----------------------------------|-----------------------------------|
| Mounting shank length $l$ mm | Order no. | Order no. angle $\alpha=45^\circ$ | Order no. angle $\alpha=60^\circ$ | Order no. angle $\alpha=90^\circ$ |
| 25                           | 4365000   | 4365010                           | 4365020                           | 4365030                           |
| 50                           | 4365001   | 4365011                           | 4365021                           | 4365031                           |
| 75                           | 4365002   | 4365012                           | 4365022                           | 4365032                           |

Transmission accuracy for 941 W  
max. 1%;  
for travel 3 mm = 0,03 mm

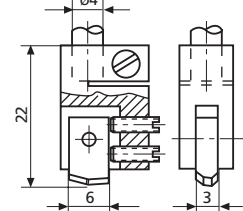
### Sensor Lever 943

|                                                                                                                                                                                                        | Order no. |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| For checking concentricity in bores and on outside diameters difficult to reach.<br>For insertion in measuring stands<br>With lifting device<br>Contact Point 901 interchangeable<br>Travel $\pm 1$ mm | 4367000   |

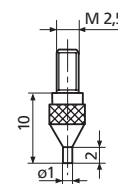
909 A



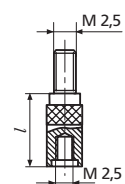
910 H



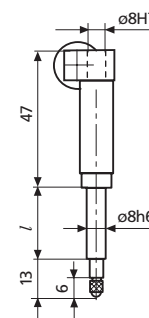
911 H



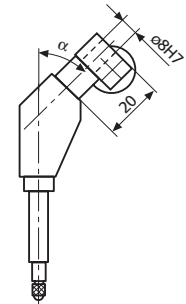
912



941 G



941 W



943

