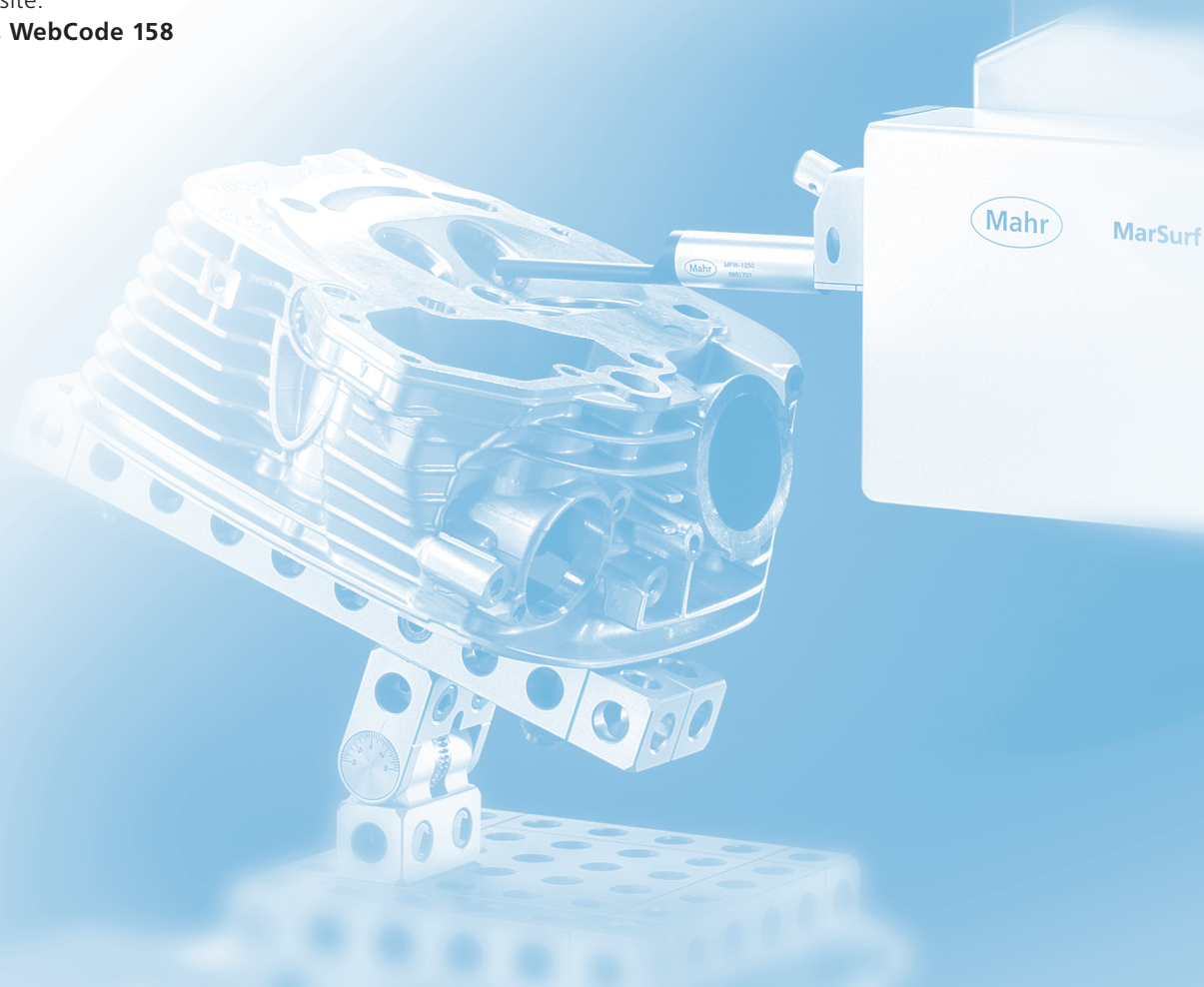


## IN THE PAST THERE WAS THE THUMBNAIL TEST. TODAY THERE IS MARSURF.



The latest information on MARSURF products can be found on our website:

**[www.mahr.com](http://www.mahr.com), WebCode 158**



► | Wherever surface structures influence the function, processing or appearance of components or products, careful testing is essential. But how can surfaces be tested? At the beginning of the 20th Century, experts still had to test by eye and touch. A practiced eye can detect features in the  $\mu\text{m}$  range, and even the much maligned thumbnail test delivered perfectly acceptable results. Now however, we live in an age of exchangeable parts, fits and internationalization, where subjective tests like this are no longer adequate. Today, computer-aided measuring instruments provide objective data. Measurement and evaluation have become considerably easier. For decades, Mahr has been a worldwide pioneer in this area, as demonstrated by the company's numerous innovations and patented solutions in the field of surface roughness metrology. The interplay between the stylus, drive and measuring setup plays a key role in influencing the quality of surface measurement tasks. This is where Mahr's core expertise comes in, as demonstrated by the company's numerous innovations and patented solutions. Over this time, we have succeeded in perfecting the stylus method, which is now in widespread use throughout the world. We can meet even the most demanding requirements for non-contact measurement, e.g. where extremely soft materials or ultra-short measuring times are involved, thanks to the range of optical sensors offered in the MarSurf product family. Developed with Mahr quality, expertise and know-how, MarSurf is the solution for all your surface metrology needs.

## ► I MarSurf. Surface Metrology

### MarSurf Surface Metrology System - The right solution for every task

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#### MarSurf Mobile Surface Roughness Measuring Instruments

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##### MarSurf Overview

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##### Pocket Surf® IV The Portable Surface Roughness Gage

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##### MarSurf PS 1 Absolute mobility

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##### MarSurf M 300

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##### MarSurf M 300C

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##### MarSurf RD 18 / RD 18 C Drive Units

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##### MarSurf Efficient Application Aids

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##### MarSurf PS 1 / M 300 / M 300 C Software

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##### MarSurf M 400

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#### PC-based Stationary Surface Measuring Instruments

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##### MarSurf XR 1

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##### MarSurf XR 20

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##### MarSurf XC 2

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##### MarSurf XC 20

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##### MarSurf UD 120 / LD 130 / LD 260

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##### MarSurf Measuring Stand ST 750 D

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##### MarSurf Data Overview

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##### MarSurf XR 20 with Topography XT 20

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##### MarSurf CNC *modular*

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##### MarSurf CNC *premium*

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##### Software MarWin

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#### Drive Units

##### MarSurf PCV 200

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##### MarSurf CD 120

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##### MarSurf GD 25

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#### Accessories Surface Probes, Standards

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#### MarSurf Optical Metrology from Mahr

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##### MarSurf CWM 100

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##### MarSurf WM 100

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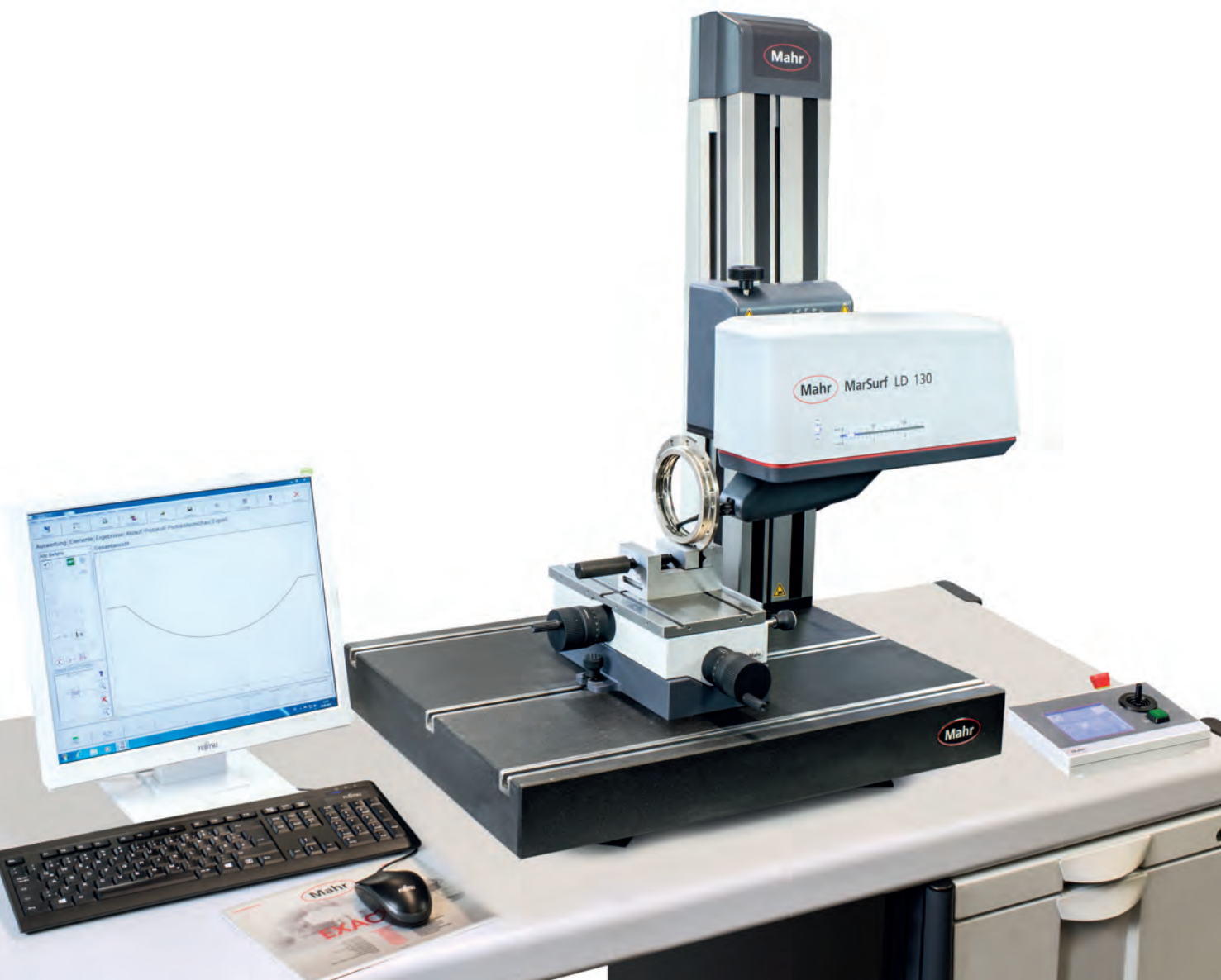
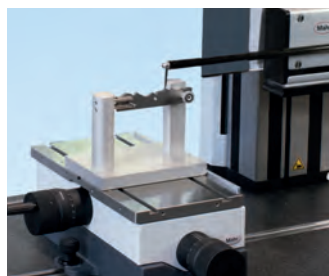
##### MarSurf FP 40/180

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## MarSurf. Surface Metrology System for all your industrial requirements

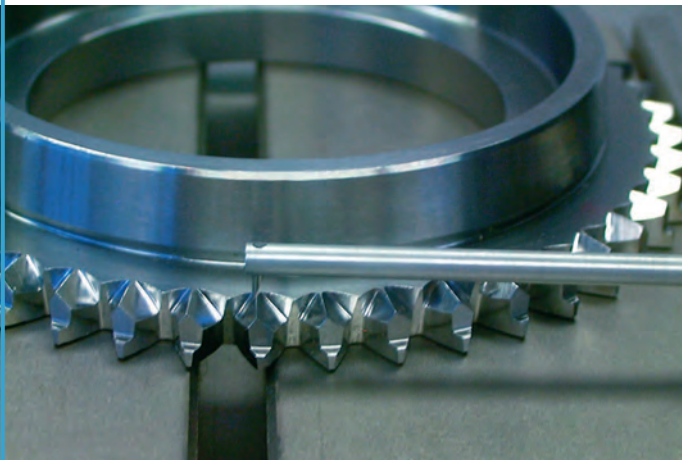
### THE RIGHT SOLUTION FOR EVERY TASK

► | In surface metrology, a distinction is made between mobile units, stationary shop-floor units and PC-based surface measuring instruments. The latter provide the very best measurement and evaluation performance for surface measurement tasks. They fulfill all the key requirements of a state-of-the-art PC-based measuring and evaluation system, including compliance with international standards, versatile evaluation methods, comprehensive documentation, large storage capacity, data export and import and networking with other systems. Comprehensive QA procedures ensure the highest quality and stability of software and hardware.





## Automotive Industry

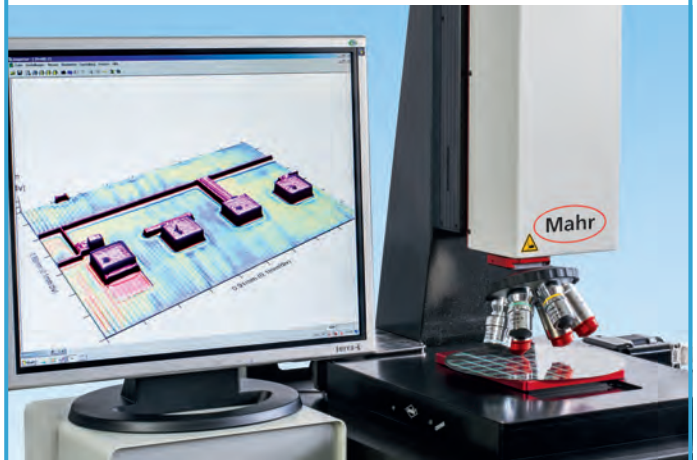


### Measurements on synchronizer rings

The automotive industry is often at the forefront of surface and contour measurement. Typical applications include measurements on crankshafts, camshafts, transmission components and engine parts. The measurement of the root geometry including roughness measurement for synchronous rings ensures both easy and smooth gear changing and a long service life.

 WebCode 331

## Electronics Industry

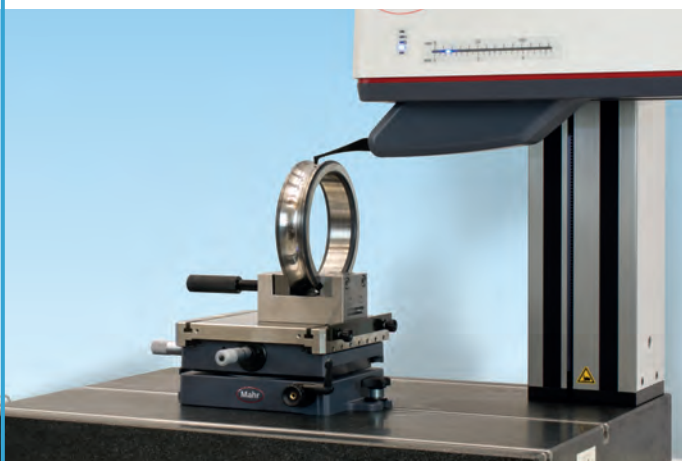


### Measurements on wafer surfaces

In the semiconductor industry, precise, fast and reliable quality assurance is a must. This applies to the production of wafers. Fast, automatic inspection of selected areas on a wafer by white light interferometer or with the confocal mode can provide a perfect analysis of the structures on the wafer. Due to the flexibility of the CVM 100, finest structures can be analyzed interferometrically and for coarse structures or elements like dies, bonding structures etc. the confocal mode can do the job.

 WebCode 333

## Mechanical Engineering Industry



### Measurements on ball rings

Ball races today need high-precision radii and minimum form deviation. Roughness measurement ensures smooth running and long service life with as little running noise as possible. MarSurf meets these requirements through user-friendly evaluation software and extremely quiet drive units.

 WebCode 9773

## Medical Technology



### Measurements on hip joints

Hip joint measurements need to be extremely accurate. Both the contour and roughness of the ball and/or socket affect the durability and performance of the joint.

 WebCode 334

## MarSurf. Handy and Precise for On-site Roughness Measurements

### MOBILE ROUGHNESS MEASUREMENT DEVICES

► | Mahr has played a key role in ensuring the success of mobile roughness measurement devices. As early as the 1980s, Mahr was setting new standards with the M4P. The products have developed in line with changing production monitoring requirements. Today's devices meet the highest international standards. Mobile roughness measurement devices from Mahr are lightweight with a handy shape for flexible handling. They offer high-precision measurements in different positions and easy positioning using V-blocks, a practical shape and light weight. | ◀



# MarSurf. Mobile Surface Roughness Measuring Instruments

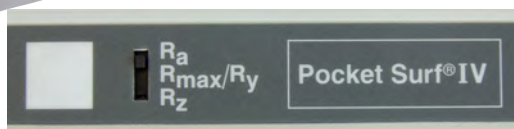
## OVERVIEW

|                                                            |                 | PocketSurf IV                                                                                       | MarSurf PS 1                                                                                                  | MarSurf M 300                                                                                                                           | MarSurf M 300 C                                                                                                                         |
|------------------------------------------------------------|-----------------|-----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
|                                                            |                 |                    |                             |                                                      |                                                      |
| Page                                                       |                 | 15-6                                                                                                | 15-10                                                                                                         | 15-12                                                                                                                                   | 15-13                                                                                                                                   |
| Measuring principle                                        |                 | Skid probe system                                                                                   | Skid probe system                                                                                             |                                                                                                                                         |                                                                                                                                         |
| Probe system                                               |                 | Piezoelectric                                                                                       | PHT probe range                                                                                               |                                                                                                                                         |                                                                                                                                         |
| Probe                                                      |                 | Stylus tip 5 or 10 $\mu\text{m}$ , measuring force 15.0 mN                                          | Inductive skidded probe, 2 $\mu\text{m}$ stylus tip, measuring force ca. 0.7 mN                               |                                                                                                                                         |                                                                                                                                         |
| Traversing length                                          |                 | ISO/ASME/DIN/MIL .075", .135", .195" 2 mm, 3.5 mm, 5 mm                                             | ISO/JIS: 1.75 mm, 5.6 mm, 17.5 mm; automatic MOTIF: 1 mm, 2 mm, 4 mm, 8 mm, 12 mm, 16 mm                      |                                                                                                                                         |                                                                                                                                         |
| Measuring range                                            |                 | Ra - 6.35 $\mu\text{m}$ /250 $\mu\text{in}$ , Ry, Rmax, Rz - 25.3 $\mu\text{m}$ /999 $\mu\text{in}$ | 350 $\mu\text{m}$ , 180 $\mu\text{m}$ , 90 $\mu\text{m}$ (changes automatically)                              |                                                                                                                                         |                                                                                                                                         |
| Profile resolution                                         |                 | 0.01 $\mu\text{m}$ / 1 $\mu\text{in}$                                                               | 32 nm, 16 nm, 8 nm (changes automatically)                                                                    |                                                                                                                                         |                                                                                                                                         |
| Evaluation lengths                                         |                 | .030", .090", .150"/ .8, 2.4, 4 mm                                                                  | 1.25 mm, 4.0 mm, 12.5 mm                                                                                      |                                                                                                                                         |                                                                                                                                         |
| Number of parameters available                             |                 | 3                                                                                                   | 31                                                                                                            | 33                                                                                                                                      | 33                                                                                                                                      |
| Parameters                                                 | DIN / ISO       | Ra, Ry, Rz, Rmax                                                                                    | Ra, Rq, Rz, Rmax, Rp, Rpk, Rk, Rvk, Mr1, Mr2, A1, A2, Vo, Rt, R3z, R Pc, Rmr, RSm, Rsk, CR, CF, CL, R, AR, Rx | Ra, Rq, Rz, Rmax, Rp, Rv, Rpk, Rk, Rvk, Mr1, Mr2, A1, A2, Vo, Rt, R3z, R Pc, Rmr, RSm, Rsk, R, AR, Rx, W, CR, CF, CL                    | Ra, Rq, Rz, Rmax, Rp, Rv, Rpk, Rk, Rvk, Mr1, Mr2, A1, A2, Vo, Rt, R3z, R Pc, Rmr, RSm, Rsk, R, AR, Rx, W, CR, CF, CL                    |
|                                                            | JIS             | —                                                                                                   | Ra, Rq, Ry (equiv. to Rz), RzJIS, tp (equiv. to Rmr), RSm, S                                                  | Ra, Rq, Ry (equiv. to Rz), RzJIS, Rp, Rv, Rpk, Rk, Rvk, Mr1, Mr2, A1, A2, Rt, tp (equiv. to Rmr), RSm, Rsk, S, R, AR, Rx, W, CR, CF, CL | Ra, Rq, Ry (equiv. to Rz), RzJIS, Rp, Rv, Rpk, Rk, Rvk, Mr1, Mr2, A1, A2, Rt, tp (equiv. to Rmr), RSm, Rsk, S, R, AR, Rx, W, CR, CF, CL |
|                                                            | ASME            | Ra, Ry, Rz, Rmax                                                                                    | Rp, Rpm, R Pc, Rsk                                                                                            | RpA, Rpm, Rmr, RSm, Rsk                                                                                                                 | RpA, Rpm, Rmr, RSm, Rsk                                                                                                                 |
|                                                            | MOTIF           | —                                                                                                   | R, AR, Rx, CR, CF, CL                                                                                         | R, AR, Rx, W, CR, CF, CL                                                                                                                | R, AR, Rx, W, CR, CF, CL                                                                                                                |
| Bluetooth                                                  |                 | —                                                                                                   | —                                                                                                             | Yes                                                                                                                                     | —                                                                                                                                       |
| Large color display                                        |                 | —                                                                                                   | —                                                                                                             | Yes                                                                                                                                     | Yes                                                                                                                                     |
| Built-in printer                                           |                 | —                                                                                                   | —                                                                                                             | Yes                                                                                                                                     | Yes                                                                                                                                     |
| Integrated roughness standard for Standard probe PHT 6-350 |                 | —                                                                                                   | Yes                                                                                                           | Yes                                                                                                                                     | —*                                                                                                                                      |
| Cylindrical drive unit with hand-held Vee-block            |                 | —                                                                                                   | —                                                                                                             | —                                                                                                                                       | Yes                                                                                                                                     |
| Drive unit with transverse tracing (optional)              |                 | —                                                                                                   | —                                                                                                             | —                                                                                                                                       | RD 18 C2                                                                                                                                |
| Internal memory                                            |                 | —                                                                                                   | max. 15 Profiles<br>max. 20000 Results                                                                        | max. 30 Profiles<br>max. 40000 Results                                                                                                  | max. 30 Profiles<br>max. 40000 Results                                                                                                  |
| Software (optional)                                        |                 | MarCom, Explorer                                                                                    | MarCom, Explorer, MarSurf XR 20                                                                               | Explorer, MarSurf XR 20                                                                                                                 | Explorer, MarSurf XR 20                                                                                                                 |
| Order no.                                                  | 2 $\mu\text{m}$ | <b>2191800</b><br>10 $\mu\text{m}$ radius                                                           | <b>6910210</b>                                                                                                | <b>6910401</b>                                                                                                                          | <b>6910431</b>                                                                                                                          |
| Order no.                                                  | 5 $\mu\text{m}$ | <b>2191802</b><br>5 $\mu\text{m}$ radius                                                            | <b>6910214</b>                                                                                                | <b>6910411</b>                                                                                                                          | —                                                                                                                                       |

\*Scope of supply



## Pocket Surf® IV the portable surface roughness gage



Nothing is easier than Pocket Surf IV's single button operation

A pocket-sized economically priced, completely portable instrument which performs traceable surface roughness measurements on a wide variety of surfaces; can be used confidently in production, on the shop floor and in the laboratory.



Built in measurement output



Economical and simple to replace battery

### Features

- Solidly built, with a durable cast aluminum housing, to provide years of accurate, reliable surface finish gaging.
- Can be used to measure any one of four, switch selectable, parameters: Ra, Rmax/Ry, Rz
- Then review any of the parameters after the measurement is complete
- Selectable traverse length 1, 3 or 5 cut-offs of 0.8 mm/0.030"
- Operates in any position – horizontal, vertical, and upside down
- Four switchable probe positions – axial (folded) or at 90°, 180° or 270°
- Even difficult-to-reach surfaces such as inside and outside diameters are accessible
- MarConnect data output for easy SPC-processing that is compatible with the most common data processing systems
- Easy-to-read LCD readout presents the measured roughness value, in microinches or micrometers, within half a second after the surface is traversed.
- Out-of-range (high or low) and "battery low" signals are also displayed
- Improved digital calibration process eliminate screwdrivers and potentiometers to simplify and enhance the calibration process
- Improved battery life with easy to replace standard 9V battery

### Technical Data

|                      |                                                                                                                                                                                                                                                                                                                                             |    |                                                  |    |                                                 |      |                                                 |    |                                                 |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|--------------------------------------------------|----|-------------------------------------------------|------|-------------------------------------------------|----|-------------------------------------------------|
| Dimensions           | 140 x 76 x 25 mm / <b>5.5" x 3" x 1"</b>                                                                                                                                                                                                                                                                                                    |    |                                                  |    |                                                 |      |                                                 |    |                                                 |
| Weight               | 435 g / 14 oz                                                                                                                                                                                                                                                                                                                               |    |                                                  |    |                                                 |      |                                                 |    |                                                 |
| Measuring Ranges     | <table> <tr> <td>Ra</td><td>0.03 µm to 6.35 µm / <b>1 µinch to 250 µinch</b></td></tr> <tr> <td>Ry</td><td>0.2 µm to 25.3 µm / <b>8 µinch to 999 µinch</b></td></tr> <tr> <td>Rmax</td><td>0.2 µm to 25.3 µm / <b>8 µinch to 999 µinch</b></td></tr> <tr> <td>Rz</td><td>0.2 µm to 25.3 µm / <b>8 µinch to 999 µinch</b></td></tr> </table> | Ra | 0.03 µm to 6.35 µm / <b>1 µinch to 250 µinch</b> | Ry | 0.2 µm to 25.3 µm / <b>8 µinch to 999 µinch</b> | Rmax | 0.2 µm to 25.3 µm / <b>8 µinch to 999 µinch</b> | Rz | 0.2 µm to 25.3 µm / <b>8 µinch to 999 µinch</b> |
| Ra                   | 0.03 µm to 6.35 µm / <b>1 µinch to 250 µinch</b>                                                                                                                                                                                                                                                                                            |    |                                                  |    |                                                 |      |                                                 |    |                                                 |
| Ry                   | 0.2 µm to 25.3 µm / <b>8 µinch to 999 µinch</b>                                                                                                                                                                                                                                                                                             |    |                                                  |    |                                                 |      |                                                 |    |                                                 |
| Rmax                 | 0.2 µm to 25.3 µm / <b>8 µinch to 999 µinch</b>                                                                                                                                                                                                                                                                                             |    |                                                  |    |                                                 |      |                                                 |    |                                                 |
| Rz                   | 0.2 µm to 25.3 µm / <b>8 µinch to 999 µinch</b>                                                                                                                                                                                                                                                                                             |    |                                                  |    |                                                 |      |                                                 |    |                                                 |
| Display Resolution   | 0.01 µm / <b>1 µin</b>                                                                                                                                                                                                                                                                                                                      |    |                                                  |    |                                                 |      |                                                 |    |                                                 |
| Measurement Accuracy | Meets ASME-B46.1, ISO, DIN standards and MIL specifications                                                                                                                                                                                                                                                                                 |    |                                                  |    |                                                 |      |                                                 |    |                                                 |
| Digital Readout      | LCD with, "Battery low" signal; "H" and "L" (measured values out-of-range)                                                                                                                                                                                                                                                                  |    |                                                  |    |                                                 |      |                                                 |    |                                                 |

## Technical Data

### Probing and Traverse Lengths

| Parameters            | Traverse Length<br>(Nominal)                                               | Evaluation Length    | Number of Cutoffs/<br>Switch Position* |
|-----------------------|----------------------------------------------------------------------------|----------------------|----------------------------------------|
| $R_a/R_y$             | 2.0 mm/ <b>.075"</b>                                                       | 0.8 mm/ <b>.030"</b> | 1                                      |
|                       | 3.5 mm/ <b>.135"</b>                                                       | 2.4 mm/ <b>.090"</b> | 3                                      |
| $R_a/R_z/R_{max}$     | 5.0 mm/ <b>.195"</b>                                                       | 4.0 mm/ <b>.150"</b> | 5                                      |
| Traverse Speed        | 5.08 mm/ <b>.2"</b> per second                                             |                      |                                        |
| Cutoff                | 0.8 mm/ <b>.030"</b> ASME 2 RC-filter                                      |                      |                                        |
| Probe Type            | Piezoelectric                                                              |                      |                                        |
| Maximum Stylus Force  | 15.0 mN / 1500 mgf                                                         |                      |                                        |
| Power                 | Consumer-type alkaline battery, 9 Volt                                     |                      |                                        |
| Battery Capacity      | Approx. 2500 measurements, depending on frequency of use and output option |                      |                                        |
| Operating Temperature | 10° to 45°C / 50° to 113° F                                                |                      |                                        |
| Storage Temperature   | -20° to 65°C / -4° to 149° F                                               |                      |                                        |

\* Othercutoff/switch positions may be used

### Pocket Surf Sets

| Order no.      |          |                                     |                                            |
|----------------|----------|-------------------------------------|--------------------------------------------|
| <b>2191800</b> | EGH-1019 | Probe, 90°, 10 µm radius, PMD-90101 | Certified Specimen, incl. Test Certificate |
| <b>2191802</b> | EGH-1026 | Probe, 90°, 5 µm radius, PMD-90101  | Certified Specimen, incl. Test Certificate |

A **Pocket Surf kit** is furnished complete in a fitted case, and includes a Pocket Surf unit with a General Purpose Probe\*\* and a 3.2 µm/**125 µinch** (nominal) Reference Specimen\*\*, 9 Volt battery and Riser Plate.

\*\* Part Numbers listed in table above.

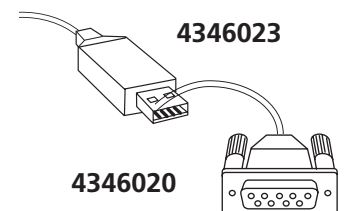


## MarConnect - USB ready

The Pocket Surf IV® employs the MarConnect interface from Mahr. Marconnect simplifies data transmission to a PC and enables quick and universal assembly of a multiple measuring station.

|                                                                           | Order no.     |                |
|---------------------------------------------------------------------------|---------------|----------------|
| <b>Data Connection Cable</b> USB (2 m) incl. MarCom Standard              | <b>16 EXu</b> | <b>4346023</b> |
| <b>Data Connection Cable</b> Opto RS232C (2 m), with SUB-D jack 9-pin     | <b>16 EXr</b> | <b>4346020</b> |
| <b>Software MarCom Professional 4.0</b> Allows for up to 68 wired devices |               | <b>4102552</b> |
| <b>Software MarCom Standard 3.1</b> Allows for 1 wired device             |               | <b>4102551</b> |

Accessories for Data Processing, see Dimensional Metrology Catalog Chapter 11





## Pocket Surf® IV the portable surface roughness gage

### Probes

#### General Purpose Probes

##### EGH-1019/EGH-1026

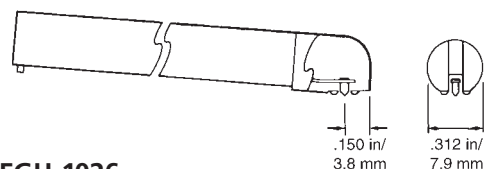
For most surface roughness applications.

##### EGH-1026

With a 90° conical diamond stylus, 5 µm/ .0002" radius\*.

##### EGH-1019

With a 90° conical diamond stylus, 10 µm/ .0004" radius.

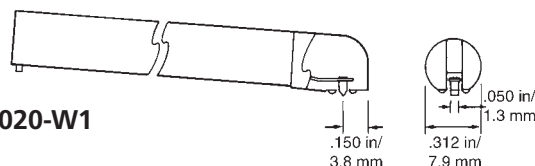


EGH-1019/EGH-1026

#### Transverse Chisel Probe

##### EGH-1020-W1

For gaging sharp edges or small O.D.'s where probe is aligned with (in 180° or closed position) to axis of traverse. 90° sapphire chisel, 10 µm/ .0004" radius.

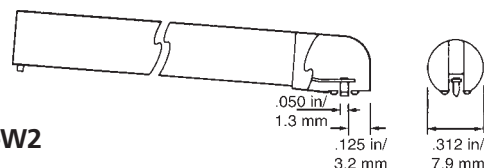


EGH-1020-W1

#### Parallel Chisel Probe

##### EGH-1020-W2

For gaging sharp edges or small O.D.'s where probe is perpendicular (in 90°- or 270° position) to axis of traverse. 90° sapphire chisel, 10 µm/ .0004" radius. Also used with EAS-2421 Vee fixture for O.D.'s smaller than 6,35 mm / .25".



EGH-1020-W2

#### Small Bore Probe

##### EGH-1021/EGH-1027

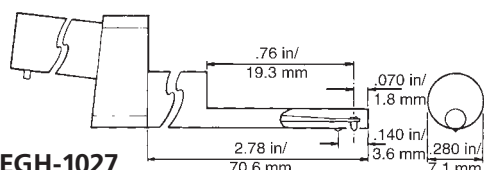
For gaging small bores (3,2 mm/ .125" minimum I.D.) up to a depth of 19 mm/ .75".

##### EGH-1027

With a 90° conical diamond stylus, 5 µm/ .0002" radius\*.

##### EGH-1021

With a 90° conical diamond stylus, 10 µm/ .0004" radius.



EGH-1021/EGH-1027

#### Groove Bottom Probe

##### EGH-1028

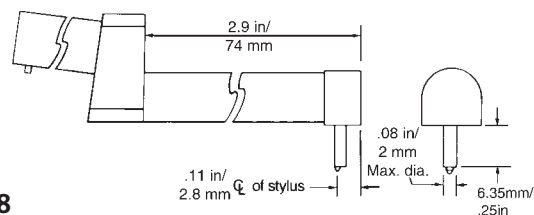
For measuring the bottom of grooves, recesses and small holes to depths of 6.35 mm/ .25".

Also used for short lands and shoulders.

With 90° conical diamond stylus, 10 µm/ .0004" radius.

**Note:** Small Bore and Groove Bottom Probes can only be used in 180° position with the Pocket Surf unit supported in a height stand or other fixture.

\* Yellow dot at connector end signifies 5 µm/ .0002" radius.

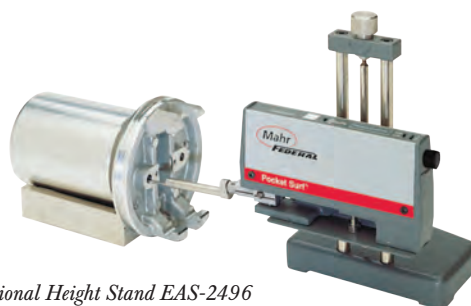


EGH-1028

Using the Groove Bottom Probe to check an "O" ring groove.



Shown with optional Height Stand EAS-2496



## Applications and Accessories

### Height Stand EAS-2496

A compact, convenient fixture with a bracket to hold the Pocket Surf gage. Designed for making measurements on a granite surface plate or on any suitable, flat working surface to a maximum height of about 111 mm / 4.375".

**Order no.** EAS-2496



### Portable vee fixture EAS-2421

For measuring small parts with outside diameters from 3.1 mm / .125" to 25 mm / 1" for lengths of 25 mm / 1" minimum - includes PS-145 setting pin.

**Order no.** EAS-2421



### Bore Adapter Kit EAS-2839

For timesaving hand-held measurement of bores without having to fix the workpiece. Accommodates all inside diameters from: 25 mm / 1" to 150 mm / 6"; depths from 25 mm / 1" to 60 mm / 2.4".

**Order no.** EAS-2839



### Bottom Plate EAS-2584

For measuring cylindrical workpieces too short (less than 89 mm / 3.5" long) for the "closed" probe position; for workpieces with short O.D.'s from 6.35 mm / .25" (minimum 38 mm / 1.5" long).

**Order no.** EAS-2584



### Vee-Adapter Kit EAS-2739

Attaches to bottom of Pocket Surf unit, permitting convenient, hand-held measurements of hard-to-reach cylindrical surfaces, such as crankshaft journals without having to fix the work piece. Suitable for parts with diameters from 5.0 mm / .19" to 125 mm / 5".

**Order no.** EAS-2739



### EAS-3048 Mounting Bracket for use with height gages

For mounting the Pocket Surf to most standard height gages. The bracket includes a rectangular bar that is 11.5 mm x 6.35 mm (0.45" x 0.25") to fit the holder of the height gage. A swivel feature is included to permit the Pocket Surf to be set anywhere within a 360° rotation.

**Order no.** EAS-3048



### Universal Stand EAS-2426

A heavy-duty stand equipped with an adjustable bracket to hold the Pocket Surf for measuring of workpieces, up to 213 mm / 8.37" tall.

**Order no.** EAS-2426



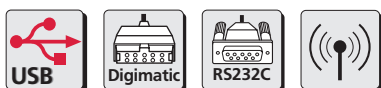
### Height Stand with Swivel

A compact, convenient fixture with an adjustable bracket to hold the Pocket Surf, anywhere within a 360° rotation, for making measurements on a surface plate or on any suitable, flat working surface.

**Order no.** 2236687



## Mobile Surface Roughness Measuring Instrument MarSurf PS 1 Absolute mobility



### Applications

- On-site surface roughness measurement
- Measuring during the production process
- Universal use on processing machinery
- For incoming goods inspection



### Features

- Small and lightweight; ideal as mobile surface roughness measuring instruments
- Large display
- Very simple to operate
- Start button is positioned on both the right and left side of the PS1; easy to operate regardless of whether you are left or right-handed but also practical for conducting upside down measurements
- Can be used horizontally, vertically, upside down etc.
- 31 parameters: offer the same range of functions as a laboratory instrument
- Parameters can be selected directly Ra, Rz
- Freely programmable, use the F1 button for direct access to any of your chosen parameters
- Evaluation of most common parameters conforming to standards and in accordance to ISO/JIS as well as characteristic curves, parameter lists (e.g. material ratio curve)
- Integrated roughness standard for the standard pick-up PHT 6-350
- Dynamic calibration function
- Select standards (DIN-ISO/JIS/ASME/MOTIF)
- Automatic cutoff selection (patented) to ensure correct measuring results
- Individual sampling lengths and shortened cutoff can be selected
- Setting of unsymmetric intersection lines for peak count calculation
- Tolerance monitoring
- Lock settings and/or password protection
- Date and/or time of measurement
- Integrated memory to store ca. 20000 results and 15 profiles
- Data transmission via the USB interface to a PC
- Evaluation with PS1/M 300 Explorer Software, MarSurf XR 20 Evaluation Software or with a MarSurf XR 20
- MarConnect interface, to connect e.g. a PC via the MarCom Software
- Main free operation: the built-in rechargeable battery can be used for up to 500 measurements before being recharged
- Supplied with: MarSurf PS1 base unit, drive unit, standard pick-up (conforming to standards), built-in battery, roughness standard integrated into base unit, height adjustment accessory, pick-up protection, charger / mains adapter with 3 mains power adapters, carrying case with shoulder strap and belt loop, USB cable, Mahr calibration certificate, operating instructions



## Technical Data

|                                        |           |                                                                                                                                                                                        |
|----------------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Unit of measurement                    |           | Metric / inch                                                                                                                                                                          |
| Measuring principle                    |           | Stylus method                                                                                                                                                                          |
| Pick-up                                |           | Inductive skidded pick-up, measuring force ca. 0.7 mN                                                                                                                                  |
| Parameters                             | DIN / ISO | Ra, Rq, Rz, Rmax, Rp, Rpk, Rk, Rvk, Mr1, Mr2, A1, A2, Vo, Rt, R3z, RPC, Rmr, RSm, Rsk, CR, CF, CL, R, AR, Rx                                                                           |
|                                        | JIS       | Ra, Rq, Ry (equiv. to Rz), RzJIS, tp (equiv. to Rmr), RSm, S                                                                                                                           |
|                                        | ASME      | Rp, Rpm, RPC, Rsk                                                                                                                                                                      |
|                                        | MOTIF     | R, AR, Rx, CR, CF, CL                                                                                                                                                                  |
| Languages                              |           | English, German, French, Italian, Spanish, Portuguese, Dutch, Swedish, Czech, Polish, Russian, Japanese, Chinese, Korean, Turkish                                                      |
| Measuring range                        |           | 350 µm, 180 µm, 90 µm (automatic switching)                                                                                                                                            |
| Profile resolution                     |           | 32 nm, 16 nm, 8 nm (automatic switching)                                                                                                                                               |
| Filter*                                |           | Phase-correct profile filter (Gaussian filter) according to DIN EN ISO 11562, Special filter according to DIN EN ISO 13565-1, Is filter according to DIN EN ISO 3274 (can be disabled) |
| Cutoff lc*                             | mm (inch) | 0.25 / 0.8 / 2.5 (0.010" / 0.030" / 0.100"); automatic                                                                                                                                 |
| Traversing length Lt*                  | mm (inch) | 1.75 / 5.6 / 17.5 (0.069" / 0.22" / 0.69"); automatic                                                                                                                                  |
| Traversing length (according to MOTIF) | mm (inch) | 1 / 2 / 4 / 8 / 12 / 16 (0.040" / 0.080" / 0.160" / 0.320" / 0.480" / 0.640")                                                                                                          |
| Short cutoff*                          |           | Selectable: 1 to 5                                                                                                                                                                     |
| Evaluation length ln*                  | mm (inch) | 1.25 / 4.0 / 12.5 (0.050", 0.15", 0.50")                                                                                                                                               |
| Number n of sampling lengths*          |           | Selectable: 1 to 5                                                                                                                                                                     |
| Calibration function                   |           | Dynamic                                                                                                                                                                                |
| Memory                                 |           | max. 15 profiles, max. 20000 results                                                                                                                                                   |
| Additional functions                   |           | Lock settings / password protection, Date/Time                                                                                                                                         |
| Dimensions                             | mm (inch) | 140 × 50 × 70 (5.51" × 1.97" × 2.76")                                                                                                                                                  |
| Weight                                 |           | 400 g (0.88 lbs)                                                                                                                                                                       |
| Rechargeable battery                   |           | Li-ion battery                                                                                                                                                                         |
| Interfaces                             |           | USB, MarConnect (RS232/USB/Digimatic)                                                                                                                                                  |
| Long-range power supply                |           | 100 V to 264 V                                                                                                                                                                         |

|                  |      |                                                                      |
|------------------|------|----------------------------------------------------------------------|
| <b>Order no.</b> | 2 µm | <b>6910210</b> (Set Includes pick-up No. 6111520 PHT 6-350 2 µm/90°) |
| <b>Order no.</b> | 5 µm | <b>6910214</b> (Set Includes pick-up No. 6111526 PHT 6-350 5 µm/90°) |

\* In accordance to ISO/JIS



MarSurf PS1 with height adjustment

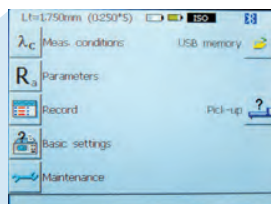


Underside of the MarSurf PS1

## Mobile Surface Roughness Measuring Instrument MarSurf M 300 A step ahead



M 300



### Applications

- On shafts, housing parts
- On large scale machines
- For large workpieces
- On milling and turning parts
- For use on grinding and honing components
- On the production line, or directly upon a machine. Ideal for rapid testing of the surface roughness of a workpiece in or on a machine
- A simple universal measuring station for checking surface roughness



RD 18



### Features

- Bluetooth wireless connection between the evaluation unit and drive unit (up to 4 m)
- Bright, illuminated color display
- Automatic selection of filter and traversing length conforming to standards
- Integrated thermal graphics printer of high print quality
- Print the R-profile via the thermal graphics printer
- Printed log either by pressing a button or automatically
- Data transfer of results and profiles via USB-interface to your PC
- Evaluation of most common parameters conforming to standards and in accordance to ISO/JIS as well as characteristic curves, parameter lists (e.g. material ratio curve)
- Printing of R-profile (ISO/ASME/JIS), P-profile (MOTIF), material ratio curve, measuring record
- Measuring units ( $\mu\text{m}/\mu\text{inch}$ ) and standards (ISO/JIS/ASME/MOTIF) are selectable
- Tolerance monitoring
- Integrated memory for the results of up to 40000 measurements and 30 profiles
- Setting of unsymmetric intersection lines for peak count calculation
- Individual sampling lengths and short cutoff can be selected
- Key pad lock and/or password protection for instrument settings
- Built-in rechargeable battery with power management
- Integrated roughness standard for the standard pick-up PHT 6-350
- Dynamic calibration function
- Date and/or time of measurement
- Software MarSurf PS1/M 300 Explorer for recording measurements (option)
- Supplied with: Evaluation unit M 300, drive unit RD 18 with integrated roughness standard, standard pick-up PHT 6-350 (conforming to standards), charger / mains adapter with 3 mains power adapters, height adjustment accessory, pick-up protection, pick-up protection with prismatic underside, end face vee-block, 2 x USB cables, 1 roll of thermal paper, shoulder strap, carrying case, Mahr calibration certificate, operating instructions

## Mobile Surface Roughness Measuring Instrument MarSurf M 300 C A step ahead



**M 300 C**

### Applications

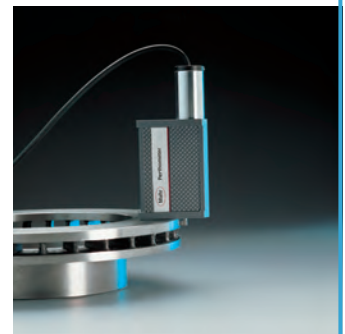
- On shafts, housing parts
- On large scale machines
- For large workpieces
- On milling and turning parts
- For use on grinding and honing components
- On the production line, or directly upon a machine. Ideal for rapid testing of the surface roughness of a workpiece in or on a machine
- A simple universal measuring station for checking surface roughness



Example: Measurement with height adjustment



Example: Upside down measurement



Example: Measurement on an end face vee

### Features

- Bright, illuminated color display
- Automatic selection of filter and traversing length conforming to standards
- Integrated thermal graphics printer of high print quality
- Easy to use due to the large color display and the operator guidance
- Printing of R-profiles with the thermo printer
- Printed log either by pressing a button or automatically
- Data transfer of results and profiles via USB-interface to your PC
- Evaluation of most common parameters conforming to standards and in accordance to ISO/JIS as well as characteristic curves, parameter lists (e.g. material ratio curve)
- Printing of R-profile (ISO/ASME/JIS), P-profile (MOTIF), material ratio curve, measuring record
- Measuring units ( $\mu\text{m}/\mu\text{inch}$ ) and standards (ISO/JIS/ASME/MOTIF) are selectable
- Integrated memory for the results of up to 40000 measurements and 30 profiles
- Tolerance monitoring
- Setting of unsymmetric intersection lines for peak count calculation
- Cylindrical drive unit with pick-up protection
- Individual sampling lengths and short cutoff can be selected
- Lock instrument settings
- Date and/or time of measurement
- Can be expanded to be an stationary measuring station
- Software MarSurf PS1/M 300 Explorer for recording measurements (option)
- Supplied with: Evaluation unit M 300 C, cylindrical drive unit RD 18 C incl. 1.8 m data connection cable, handheld vee block with height adjustable feet, standard pick-up PHT 6-350/2 $\mu\text{m}$  (conforming to standards), roughness standard PRN 10 with Mahr calibration certificate, 1 roll of thermal paper, pick-up protection with prismatic underside, dia. 8 mm mounting clamp for drive unit, charger / mains adapter with 3 mains power adapters, 1 x USB cable (for connection to a PC), shoulder strap, carrying case, operating instructions



## Mobile Surface Roughness Measuring Instrument MarSurf M 300 / M 300 C

### Technical Data

|                                                  |                                    |                                                                                                                                                                                             |
|--------------------------------------------------|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Measuring principle                              |                                    | Stylus method                                                                                                                                                                               |
| Traversing speed                                 | mm (inch)                          | 0.5 mm/s (0.02"/s)                                                                                                                                                                          |
| Measuring range                                  |                                    | 350 µm (0.014")                                                                                                                                                                             |
| Profile resolution                               |                                    | 90 µm, 180 µm, 350 µm (automatic switching)<br>8 nm, 16 nm, 32 nm (automatic switching)                                                                                                     |
| Filter                                           |                                    | Gaussian filter, Ls-Filter (switchable)                                                                                                                                                     |
| Cutoff                                           | mm (inch)                          | 0,25, 0,8, 2,5 (0.010", 0.032", 0.100")                                                                                                                                                     |
| Short Cutoff                                     |                                    | wählbar                                                                                                                                                                                     |
| Traversing lengths as per DIN / ISO / ASME / JIS | mm (inch)                          | 1,75, 5,6, 17,5 (0.070", 0.2242, 0.700")                                                                                                                                                    |
| Traversing lengths as per EN ISO 12085 (MOTIF)   | mm                                 | 1, 2, 4, 8, 12, 16                                                                                                                                                                          |
| Evaluation lengths                               | mm (inch)                          | 1,25, 4, 12,5 (0.05", 0.16", 0.5")                                                                                                                                                          |
| Number of sampling lengths selectable:           |                                    | 1-5                                                                                                                                                                                         |
| Parameters                                       | DIN / ISO:                         | Ra, Rq, Rz, Rmax, Rp, Rv, Rpk, Rk, Rvk, Mr1, Mr2, A1, A2, Vo, Rt, R3z, R <sub>Pc</sub> , R <sub>mr</sub> , R <sub>Sm</sub> , R <sub>Sk</sub> , R, AR, Rx, W, CR, CF, CL                     |
|                                                  | JIS:                               | Ra, Rq, Ry (equiv. to Rz), RzJIS, Rp, Rv, Rpk, Rk, Rvk, Mr1, Mr2, A1, A2, Rt, tp (equiv. to R <sub>mr</sub> ), R <sub>Sm</sub> , R <sub>Sk</sub> , S, R, AR, Rx, W, CR, CF, CL              |
|                                                  | ASME:                              | R <sub>pA</sub> , R <sub>pm</sub> , R <sub>mr</sub> , R <sub>Sm</sub> , R <sub>Sk</sub>                                                                                                     |
|                                                  | MOTIF:                             | R, AR, Rx, W, CR, CF, CL                                                                                                                                                                    |
| Vertical scale                                   |                                    | Automatic/selectable                                                                                                                                                                        |
| Horizontal scale                                 |                                    | Depending on the cutoff                                                                                                                                                                     |
| Record contents                                  |                                    | R -profile, MRK, P-profile (MOTIF), results                                                                                                                                                 |
| Printing                                         |                                    | Automatic/manual<br>Record with time                                                                                                                                                        |
| Surface hardness                                 |                                    | Ideal for surface hardness >50 Shore                                                                                                                                                        |
| Calibration function                             |                                    | Dynamic                                                                                                                                                                                     |
| Memory                                           |                                    | Integrated memory<br>For the storage up to 40000 measurements and up to 30 profiles<br>µm/inch selectable                                                                                   |
| Measuring units                                  |                                    | English, German, French, Italian, Spanish, Portuguese, Dutch, Swedish, Czech, Polish, Russian, Japanese, Chinese, Korean, Turkish                                                           |
| Languages selectable:                            |                                    | Yes                                                                                                                                                                                         |
| Blocking instrument settings                     |                                    | Yes                                                                                                                                                                                         |
| Password protection                              |                                    | Yes                                                                                                                                                                                         |
| LCD                                              |                                    | High resolution color display, 3.5", 320 x 240 pixel                                                                                                                                        |
| Printer                                          |                                    | Thermal printer, 384 points/horizontal line, 20 characters/line                                                                                                                             |
| Printing speed                                   |                                    | ca. 6 lines/second corresponds to approx. 25 mm/s (1"/s)                                                                                                                                    |
| Thermal paper                                    |                                    | Dia. 40.0 mm-1.0 mm, width 57.5 mm-0.5 mm, coated                                                                                                                                           |
| Interface                                        |                                    | USB, MarConnect                                                                                                                                                                             |
| Power supply                                     |                                    | NiMH battery, capacity: approx. 500 measurements (depending on the number and length of record printouts), plug-in power pack with three mains plugs, for input voltages from 90 V to 264 V |
| Power management                                 |                                    | Yes                                                                                                                                                                                         |
| Connections                                      |                                    | Drive unit, power pack, USB, MarConnect                                                                                                                                                     |
| Protection class                                 | M 300 / M 300 C<br>RD 18 / RD 18 C | IP 42<br>IP 40                                                                                                                                                                              |
| Temperature range for storage                    |                                    | -15°C to +55°C (5°F to 131°F)                                                                                                                                                               |
| Temperature range for operation                  |                                    | +5°C to +40°C (41°F to 104°F)                                                                                                                                                               |
| Relative humidity                                |                                    | 30 % to 85 %                                                                                                                                                                                |
| Dimensions (L x W x H)                           | M 300 / M 300 C                    | 190 x 140 x 75 mm (7.5" x 5.5" x 3")                                                                                                                                                        |
| Dimensions (L x W x H)                           | RD 18                              | 130 x 70 x 50 mm (5.1" x 2.7" x 2")                                                                                                                                                         |
| Dimensions (L x dia.)                            | RD 18 C                            | 139 x 26 mm (5.5" x 1")                                                                                                                                                                     |
| Dimensions (L x W x H)                           | RD 18 C*                           | 82 x 34 x 59 mm (3.2" x 1.3" x 2.3")                                                                                                                                                        |
| Weight                                           | M 300 / M 300 C                    | ca. 1 kg                                                                                                                                                                                    |
|                                                  | RD 18                              | ca. 300 g                                                                                                                                                                                   |
|                                                  | RD 18 C                            | ca. 165 g                                                                                                                                                                                   |
|                                                  | RD 18 C*                           | ca. 55 g                                                                                                                                                                                    |
| Order no.                                        | M 300 Set 2 µm                     | 6910401                                                                                                                                                                                     |
| Order no.                                        | M 300 Set 5 µm                     | 6910411                                                                                                                                                                                     |
| Order no.                                        | M 300 C Set 2 µm                   | 6910431                                                                                                                                                                                     |

\* Handheld Vee block

## Mobile Surface Roughness Measuring Instrument MarSurf M 300

### Drive Unit MarSurf RD 18

#### Bluetooth Technology

**Unique:** Cable-free connection between evaluation unit and drive unit!

A further advantage is the connection of several drive units to only one evaluation unit.



#### Features

- The well-proven PHT-skid probes are implemented in the drive unit.
- Can be connected via a cable
- Supplied with: Drive unit RD 18 with integrated roughness standard

#### Technical Data

|                                     |                                               |
|-------------------------------------|-----------------------------------------------|
| Tracing direction                   | Longitudinal                                  |
| Traversing length as per DIN/ISO    | adjustable on M 300                           |
|                                     | 1.75 mm, 5.6 mm, 17.5 mm (0.07", 0.22", 0.7") |
| as per EN ISO 12085                 | 1 mm, 2 mm, 4 mm, 8 mm, 12 mm, 16 mm          |
| Traverse speed                      | 0.5 mm/s                                      |
| Dimensions (w/o pick-up protection) | dia. 24 mm, L = 112 mm                        |
| Bluetooth range                     | up to 4 m                                     |
| <b>Order no.</b>                    | <b>6910403</b>                                |

### Drive Unit MarSurf RD 18 C2 for transverse tracing



#### Features

- During the manufacturing process, surface measurements of work pieces usually require special tools to find the right solution for a particular task; e.g. transverse scanning on a crank or camshafts, or measuring bearings. For such tasks the drive unit RD 18 C2 is available for transverse scanning.
- The well-proven PHT-skid probes are implemented in the drive unit.
- The drive unit RD 18 C2 is attached in the same way as the RD 18. By being able to use both types of drive units the range of application offered by the mobile MarSurf M 300 C is broadened.
- Supplied with: Drive unit RD 18 C2, pick-up protection with prismatic underside, pick-up protection and a screwdriver

#### Technical Data

|                                                       |                                |
|-------------------------------------------------------|--------------------------------|
| Tracing direction                                     | Transverse                     |
| Traversing length as per DIN/ISO                      | adjustable on M 300            |
|                                                       | 1.75 mm, 5.6 mm (0.07", 0.22") |
| as per EN ISO 12085                                   | 1 mm, 2 mm, 4 mm               |
| Traverse speed                                        | 0.1 mm/s and 0.5 mm/s          |
| Dimensions (w/o pick-up protection)                   | dia. 24 mm, L = 142 mm         |
| <b>Order no. RD 18 C2</b>                             | <b>6910426</b>                 |
| <b>Order no. chuck RD 18 C2 for Ø 5 mm to Ø 80 mm</b> | <b>6850738</b>                 |

## Optional probes for MarSurf PS1 / M 300 / M 300 C

### Probes for various measuring tasks

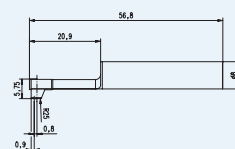
The P-probes are characterized by special construction features:

- Stylus tip geometry as per EN ISO 3274, standard  $2\ \mu\text{m}/90^\circ$
- Measuring force of approx. 0.7 mN (as per EN ISO 3274)
- Reliable inductive converter
- Robust, rigid housing
- Self-aligning, elastic bearings
- Reliable plug and socket connections

### Pick-up PHT 6-350 (standard probe)



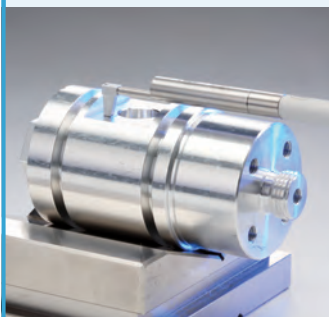
System Single-skid pick-up with spherical skid  
 Skid radius in traversing direction 25 mm (.984"), at right angles 2.9 mm (.114")  
 Contact point 0.8 mm (.0315") in front of the stylus  
 Meas. range 350  $\mu\text{m}$  (0.014")  
 Specification for plane surfaces, bores with a dia. larger than 6 mm (.236") and a max. depth of 17 mm (.669"), grooves with a width larger than 3 mm (.118"); min. workpiece length = traversing length + 1 mm (.0394")



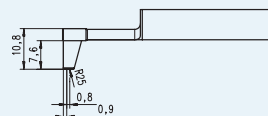
**Order no.** 6111520\* probe with  $2\ \mu\text{m}/90^\circ$  tip, (Black Tip)  
**Order no.** 6111526\* probe with  $5\ \mu\text{m}/90^\circ$  tip, (Blue Tip)

\* Included in scope of supply with selected Order No.

### Pick-up PHT 11-100

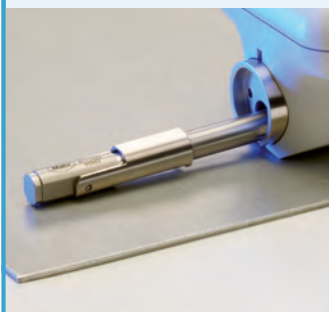


System Single-skid pick-up with spherical skid  
 Skid radius in traversing direction 25 mm (.984"), at right angles 2.9 mm (.114")  
 Contact point 0.8 mm (.0315") in front of the stylus  
 Meas. range 100  $\mu\text{m}$  (.00394")  
 Specification for plane surfaces, bores with a dia. larger than 11 mm (.433") and a max. depth of 14 mm (.551"), grooves with a width larger than 2.5 mm (.098")

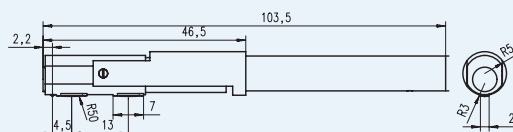


**Order no.** 6111524

### Pick-up PT 150



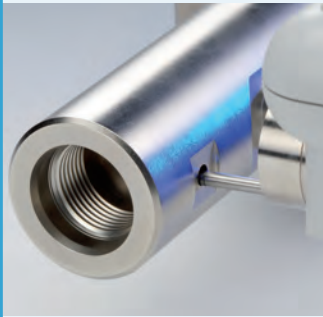
System Dual-skid pick-up with spherical skid  
 Skid radius in traversing direction 50 mm (1.969"), at right angles 3 mm (.118")  
 Contact point 4.5 mm (.177") in front of the stylus  
 Meas. range 150  $\mu\text{m}$  (.006")  
 Specification for measurements on metal sheets and roller surfaces according to DIN EN 10049 (SEP). min. workpiece length = tracing length + 5 mm (.197")



**Order no.** 6111523

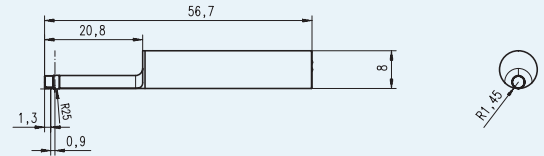


## Pick-up PHT 3-350



System Single-skid pick-up with spherical skid  
 Skid radius in traversing direction 25 mm (.984"),  
 at right angles 1.45 mm (.0571")  
 Contact point 0.9 mm (.0354") in front of the stylus  
 Meas. range 350  $\mu\text{m}$  (0.014")  
 Specification for bores with a dia. larger than 3 mm (.118") and  
 a max. depth of 17 mm (.669 ")  
 min. workpiece length =  
 traversing length + 1 mm (.0394")

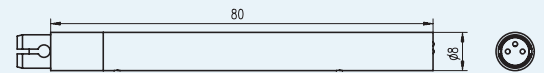
Order no. 6111521



## Pick-up extension PHT (80 mm) for P probes



Order no. 6850540

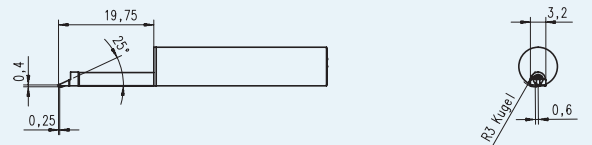


## Pick-up PHTF 0.5-100

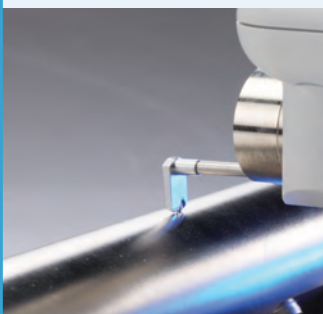


System Single-skid pick-up with spherical skid  
 Skid radius in traversing direction 25 mm (.984"),  
 at right angles 1.45 mm (.0571")  
 Contact point 0.6 mm (.0236") at the side the stylus  
 Meas. range 100  $\mu\text{m}$  (.00394")  
 Specification e.g. for gear tooth flanks with a modulus larger than 0.8  
 Calibration via Geometric standard PGN

Order no. 6111522

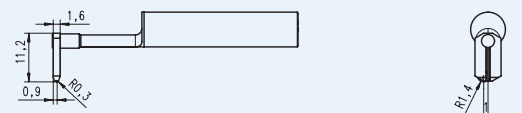


## Pick-up PHTR-100



System Single-skid pick-up with lateral, spherical skid  
 Skid radius in traversing direction 0.3 mm (.012")  
 stylus radius 2  $\mu\text{m}$  (.0008"), 90°  
 Specification for measurements on concave and convex surfaces  
 Calibration via Geometric standard PGN

Order no. 6111525



## MarSurf PS 1 / M 300 Accessories

### Transverse tracing adapter with vee-block holder for PS 1 / RD 18

For hand-held transverse tracing of cylindrical measuring objects, a pick-up adapter and a vee-block can be mounted to the MarSurf PS1 / RD 18 unit. According to the diameter of the measuring object, two different vee-blocks are available:

- Vee-block with 120° angle of Vee, for diameters from 5 up to 50 mm (0.2" to 2")
- Vee-block with 150° angle of Vee, for diameters from 50 up to 130 mm (2" to 5.1").



#### Order no.

Adapter for transverse tracing  
Vee-block holder

**6850541**  
**6850542**

### End face vee-block for PS 1 / RD 18\*

Suitable for measurements on flat end face of cylindrical and planar components.

\* Included in the M 300 Set



#### Order no.

End face vee-block

**6910203**



### Pick-up protection for PS1 / RD 18 / RD 18 C

#### Order no.

Pick-up protection, steel  
Pick-up protection with header vee-block, steel  
Pick-up protection, plastic\*  
Pick-up protection header vee-block, plastic\*\*

**6850716**  
**6850715**  
**7028532**  
**7028530**

\* With PS 1 and M 300 Set included in the scope of supply

\*\* With M 300 and M 300 C Set included in the scope of supply



Illustration: 7028532

## MarSurf PS1 / M 300 / M 300 C Accessories

### Mount for measuring stand ST

Accessories for measuring stands (these are not included in the measuring stands scope of supply):

#### Mount for MarSurf PS1 / RD 18

The drive unit RD 18 can in the mount be pivoted and locked in any position ( $\pm 15^\circ$ )

**Order no.** 6910201

#### Mount for MarSurf RD 18 C

The drive unit RD 18C can in the mount be pivoted and locked in any position ( $\pm 15^\circ$ )

**Order no.** 6851304

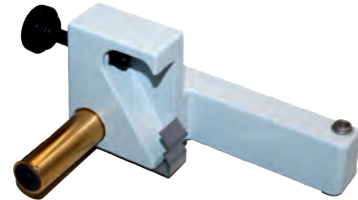


Illustration: 6910201

### Measuring stand ST

#### Measuring stand ST-D

|                        |                                |
|------------------------|--------------------------------|
| Height adjustment      | 0 to 300 mm, with a hand wheel |
| Dimensions (L x W x H) | 175 x 190 x 385 mm             |
| Weight                 | ca. 3 kg                       |

**Order no.** 6710803

#### Measuring stand ST-F

Grantee plate. The required measuring height can be adjusted with a hand wheel for convenient and accurate positioning of the drive unit.

|                        |                                |
|------------------------|--------------------------------|
| Height adjustment      | 0 to 300 mm, with a hand wheel |
| Dimensions (L x W x H) | 400 x 300 x 415 mm             |
| Weight                 | ca. 35 kg                      |

**Order no.** 6710806

#### Measuring stand ST-G

Grantee plate with a 10 mm (.39 in) T-slot for mounting work pieces. The required measuring height can be adjusted with a hand wheel for convenient and accurate positioning of the drive unit.

|                        |                                |
|------------------------|--------------------------------|
| Height adjustment      | 0 to 300 mm, with a hand wheel |
| Dimensions (L x W x H) | 500 x 300 x 415 mm             |
| Weight                 | ca. 35 kg                      |

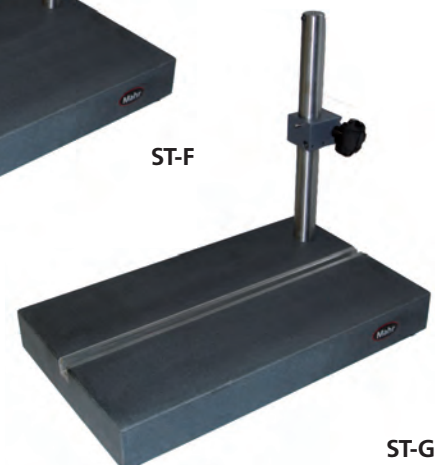
**Order no.** 6710807



ST-D



ST-F

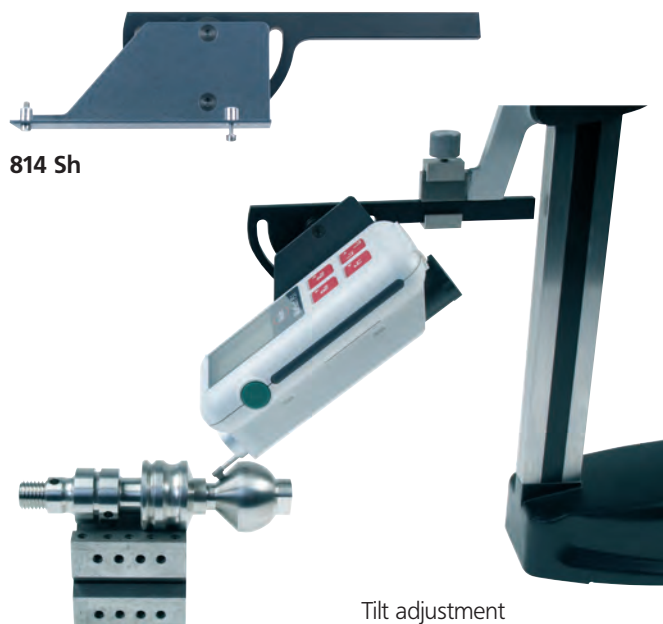


ST-G

## MarSurf PS1 / M 300 Accessories

### Mounting bracket for Digimar 814 SR

|                                                                                   | Order no.      |
|-----------------------------------------------------------------------------------|----------------|
| <b>814 Sh</b> Adjustable mounting bracket to connect the PS 1 / RD 18 to a 814 SR | <b>2247086</b> |



For additional Product Information and Technical Data regarding the Digimar 814 SR for MarSurf PS 1 / RD 18, please refer to page 2-19

### Efficient Application Aids for Manufacturing

#### MarSurf MDR-2



Tough manufacturing environments require quick and easy roughness measurements. The shop floor is particularly demanding on measuring instruments. **Application aids** from **Mahr** are the perfect solution.

They work together with the evaluation units of the M 300 series. A calibration / resting station is already included in the scope of delivery.

- Special design allows precise, easy positioning of measuring instrument
- Easy to use even without specialist metrological knowledge
- Drive unit protected from environmental influences that might disrupt the measurement
- Probe protection, i.e. probe is only extended during measurement
- Surface protection material ensures measurement leaves no marks on the workpiece

#### MarSurf MBF-2

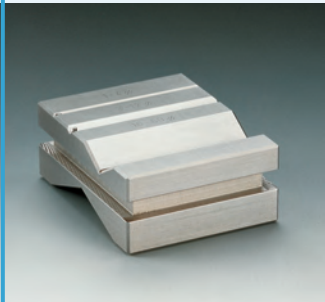


#### MarSurf MCB-7



WebCode 10483



**MarSurf PS 1 / M 300 / M 300 C Accessories****Vee-block PP**

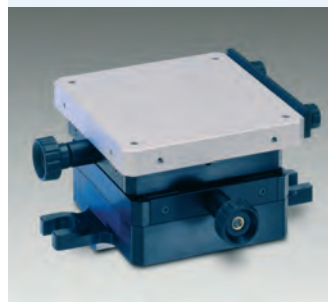
With four different prisms for mounting axis-symmetrical workpieces with diameters from 1 mm to 160 mm (.0394" to 6.30").

Dimensions (L x W x H)  
80 x 100 x 40 mm  
3.91" x 3.15" x 1.58"

Weight 1.5 kg / 3.31 lb

Including clamping springs for holding light workpieces in the prism.

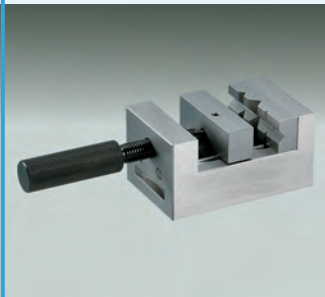
**Order no. 6710401**

**XY table CT**

For mounting and aligning workpieces. Can be adjusted in two coordinates by 15 mm (.591").

Table surface 120 x 120 mm  
Table surface 4.728" x 4.728"  
with two brackets.

**Order no. 6710529**

**Parallel vice PPS**

For mounting rectangular and cylindrical workpieces

Jaw width 70 mm / 2.76"  
Jaw height 25 mm / .984"  
Span 40 mm / 1.58"  
Total height 58 mm / 2.28"  
Weight 2 kg / 4.41 lb

**Order no. 6710604**

**Mini Precision Vise 109 PS as set**

With mini precision vises. Depending on the version with prism jaws, carrier plates, stands and mini dividing attachment. Included in a plastic case

Width of jaws 15 / 25 / 35 mm

**Order no. 4246819**

**Roughness standard PRN 10**

With Mahr calibration certificate. Roughness standard with turned profile, chromed. Profile depth ca. 10  $\mu\text{m}$  (.394  $\mu\text{inch}$ ), for checking the roughness measuring station.

**Order no. 6820420\***

*\* With the M 300 C Set this is included in the scope of supply.*

**Geometric Standard PGN**

Surface standard with sinusoidal groove profile for dynamic monitoring of the roughness measuring station. Ra, Rz, Rmax. Optical flat. The following versions are available:

|               |                                                                                                      | <b>Order no.</b> |
|---------------|------------------------------------------------------------------------------------------------------|------------------|
| <b>PGN 1</b>  | Profile depth ca. 1.5 $\mu\text{m}$ (60 $\mu\text{inch}$ ),<br>groove distance ca. 0.10 mm (0.0039") | <b>6820602</b>   |
| <b>PGN 3</b>  | Profile depth ca. 3 $\mu\text{m}$ (120 $\mu\text{inch}$ ),<br>groove distance ca. 0.12 mm (0.0047")  | <b>6820601</b>   |
| <b>PGN 10</b> | Profile depth ca. 10 $\mu\text{m}$ (394 $\mu\text{inch}$ ),<br>groove distance ca. 0.20 mm (0.0079") | <b>6820605</b>   |

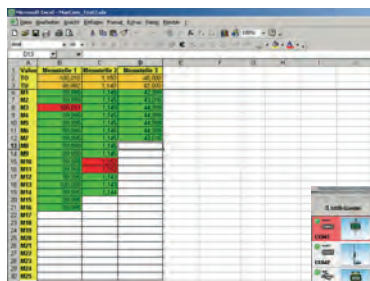
|                                                                  |                |
|------------------------------------------------------------------|----------------|
| Mahr-calibration certificate for PGN                             | <b>9027715</b> |
| DKD (German Calibration Service) calibration certificate for PGN | <b>6980102</b> |

## MarSurf PS 1 / M 300 / M 300 C Accessories

### MarCom Software for PS 1 / M 300 / M 300 C

#### Software MarCom Professional

- Measured values can be directly transferred into MS Excel (from version 97) or into a text file or key code
- The measured values from each instrument can be sent to a different column, table or folder in Excel
- Data transmission via USB and/or 2 serial COM interfaces
- Flexible and comfortable data transmission: you can either press the "Data" button on the measuring instrument or on the data cable; via a computer keyboard, timer; or by activating a foot switch connected to an USB interface



#### Software MarCom Standard

(included with the USB data cable)

Features and system requirements are identical to MarCom Professional, except that it only has one USB and one serial COM interface.

Order no.

Software MarCom Professional

4102552

Software MarCom Standard

4102551

Data Cable 16 EXu incl. MarCom Standard

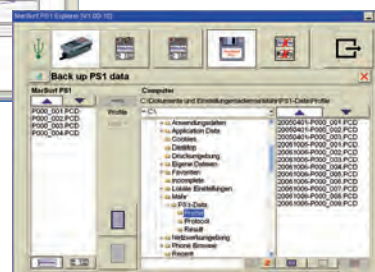
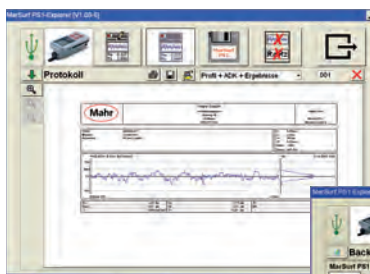
4102357

### Software MarSurf PS 1 / M 300 Explorer

- The software can be used to secure and document your measuring results and profiles (simply use Drag & Drop)
- The stored data can for example, be printed out on a A4 sheet or in any other format
- The measuring data can be displayed in different forms: profile and results, results, profile + MRC + results, statistics, and much more

Order no.

6910205

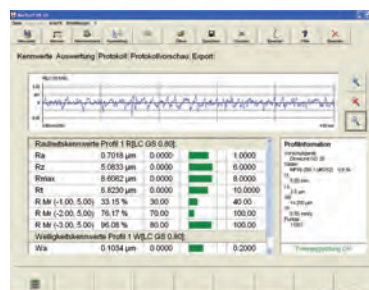


### Evaluation Software MarSurf XR 20

- An easy way to evaluate and document data based on MarWin
- Evaluation and documentation of the results can be conducted independently and away from the measuring station
- Filing including documentation is made simple
- Workstation version available

Order no.

6299054



## MarSurf. Surface Metrology



### MOBILE ROUGHNESS MEASUREMENT

### MOBILE AND STATIONARY SURFACE MEASUREMENT FOR ROUGHNESS AND CONTOUR





## MarSurf M 400. The Best of the "Mobiles"

Easy. Fast. Innovative. With skidless tracing and automatic zero setting.

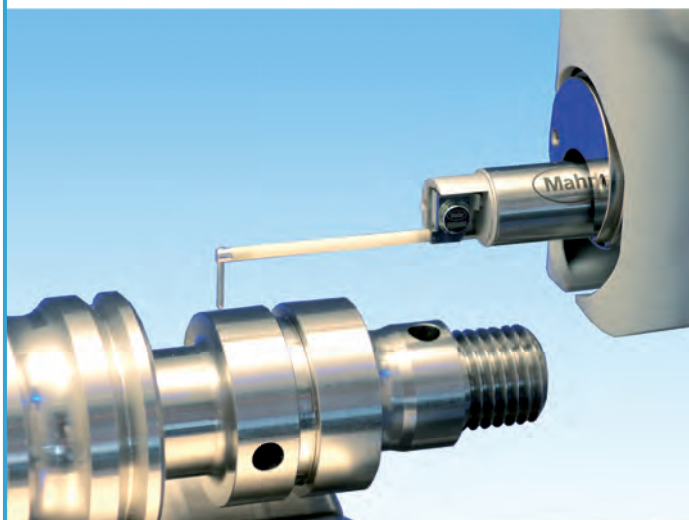


Measuring in production

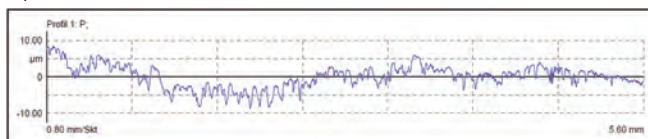
### Description

The need for high quality surface metrology already in the mobile area is increasing. In many cases, a skidded measurement is no longer sufficient and skidless tracing is required instead. Especially when determining parameters from the unfiltered P profile or waviness parameters, a skidless measurement is absolutely necessary. MarSurf M 400 fulfills these characteristics completely and additionally has the advantage of easy operation even for complex measuring tasks.

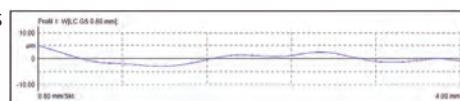
The automatic zero setting option spares the user complicated manual zero setting. After pressing the start button, zero setting and subsequent measurement are started right away.



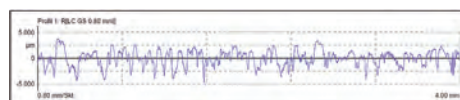
### P profiles



### W profiles



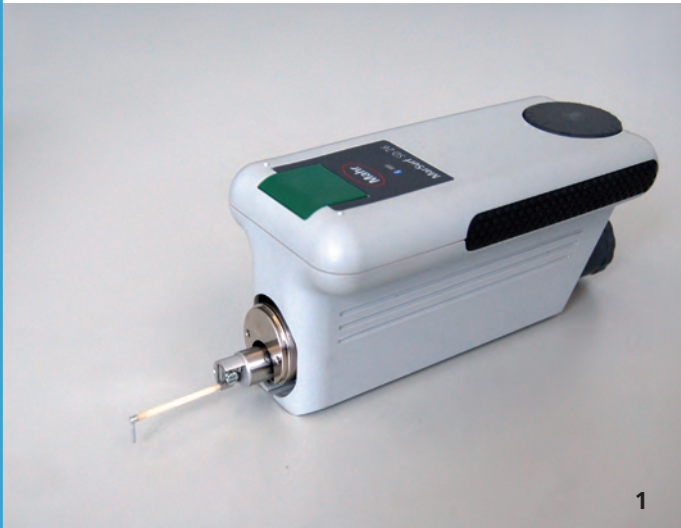
### R profiles



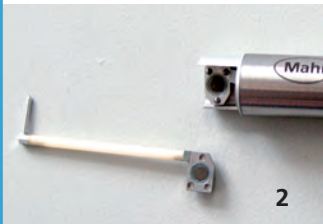


## MarSurf M 400. The Best of the "Mobiles"

### Drive Unit SD 26 and Probe System BFW-250



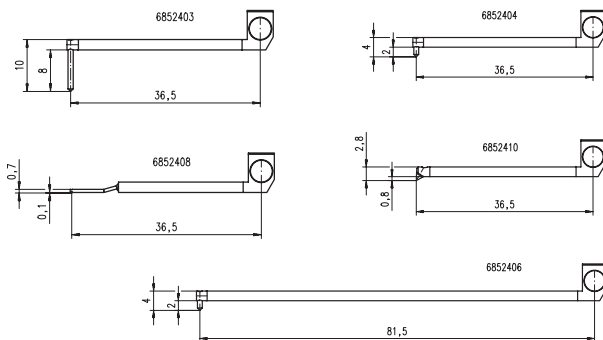
1



2



3



4

The possibility to expand the mobile surface measuring unit to a small stationary work station can be easily and quickly realized by adding only a few components from the line of MarSurf accessories.

Fast and easy alignment of the drive unit relative to the testpiece thanks to the inclination adjustment option.

The MarSurf M 400 enables the evaluation of parameters from the P, W and R profiles.

### Features

- **Skidless tracing** with high precision probe system (1)
- **Fast probe arm change** due to magnetic probe arm holder (2, 3, 4)
- **Protection from damage**
- **Only a few seconds of setting time required** due to motorized height adjustment of the drive unit with automatic zero setting
- **Flexible handling** with cable-free *Bluetooth* connection
- **Concise, clear and easy** due to brilliant color display for the depiction of results and operator guidance
- **Mobile use** due to operation with AC adapter or built-in battery
- **Internationally up to date** with all common parameters as per ISO, JIS, ASME, many integrated languages
- **Documentation with quality** with integrated thermal printer for printout of profile and results
- **Standardized measuring point** density despite increased measuring speed



Upside down measurement with vee-block  
Automatic zero setting of the BFW-250



MarSurf measuring station with measuring stand ST-G

## MarSurf M 400 The Best of the "Mobiles"



### Scope of Delivery

- Evaluation unit MarSurf M 400
- Drive unit MarSurf SD 26 incl. probe system BFW-250
- Standard probe arm (6852403)
- 1 thermo paper roll
- Wide-range AC adapter mit 3 adapters
- 2 x USB cables (to connect to PC and for use with cable)
- Operating instructions

All items are delivered in a practical carrying case.

**MarSurf M 400 set:**

**Order no. 6910404**

### Technical Data

|                                                       |                                                                                                       |
|-------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| Measuring principle                                   | Tactile stylus method                                                                                 |
| Probes                                                | BFW skidless probe system                                                                             |
| Measuring range                                       | +/-250 µm (to +/-750 µm for triple probe arm length)                                                  |
| Profile resolution                                    | Measuring range ±250 µm: 8 nm<br>Measuring range ±25 µm: 0.8 nm                                       |
| Filter as per ISO/JIS                                 | Gaussian filter as per ISO 11562<br>Filter as per ISO 13565                                           |
| Cutoff lc as per ISO/JIS                              | 0.25 mm, 0.8 mm, 2.5 mm, automatic, variable                                                          |
| Number n of individual measuring paths as per ISO/JIS | 1–5                                                                                                   |
| Probe speed                                           | 0.2 mm/s; 1.0 mm/s                                                                                    |
| Measuring force                                       | 0.7 mN                                                                                                |
| Parameters                                            | Over 50 parameters for R-, P-, W-profiles according to current standards ISO/JIS or motif (ISO 12085) |

### Applications

#### Mechanical engineering

Bearings, shafts, racks, valves

#### Automotive industry

Steering, brake systems, transmissions, crankshafts, camshafts, cylinder heads, cylinder blocks, turbochargers

#### Steel industry

Measurement of sheet metal surfaces  
Measurement of roller surfaces

#### Medical industry

Roughness depth measurement of hip and knee prosthetics

#### Aerospace

Turbine components

### Accessories

#### Measuring stands

- ST-D, ST-F and ST-G
- Mount on measuring stand

#### Further accessories

XY table CT 120, parallel vice, prism block  
Diverse probe arms for the probe system BFW

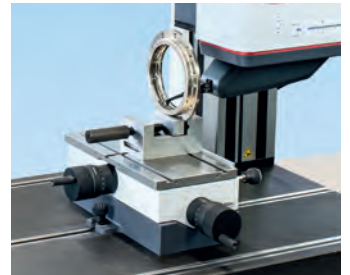
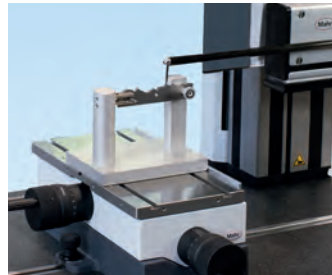


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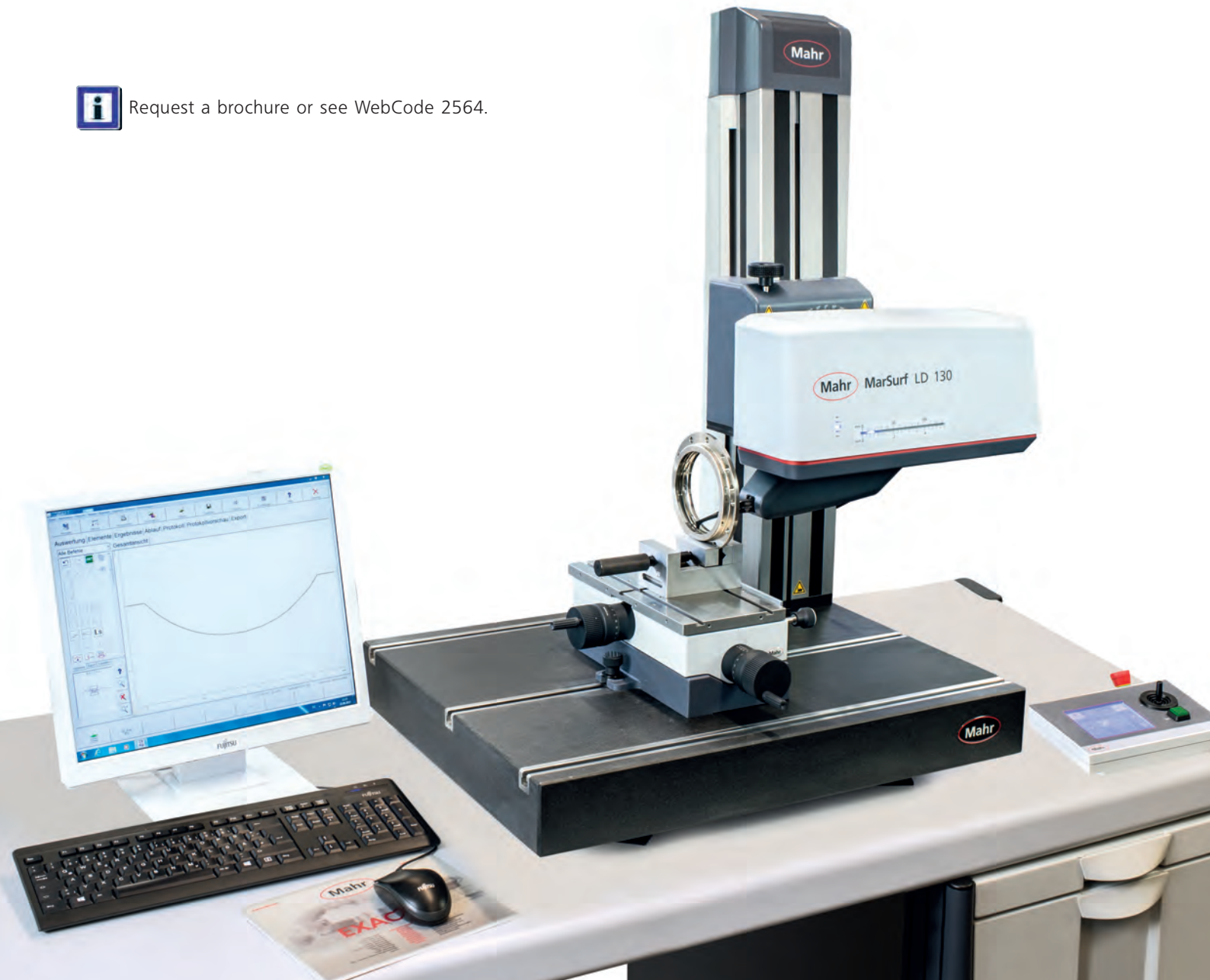
# MarSurf. PC-based Stationary Surface Measuring Stations

## VERSATILE, HIGH-PERFORMANCE UNITS FOR INSPECTION ROOM AND LABORATORY

► | This equipment facilitates manual and automated operation. By means of different software components and connection of various drive units measurement of roughness, contour and topography is possible. | ◀



Request a brochure or see WebCode 2564.





## MarSurf XR 1



### Description

#### **MarSurf XR 1. The right unit to inexpensively enter into the world of convenient surface metrology.**

Whether in the measuring room or in production, the PC-based unit provides all common parameters and profiles of international standards. MarSurf XR 1 at Mahr means future-oriented roughness software.

### Features

- Over 80 parameters for R, P, W profiles according to current standards, ISO/JIS or MOTIF (ISO 12085) selectable
- Band pass filter Ls according to current standards, Ls can also be switched off or freely varied
- Extensive measuring records
- Quick and Easy measuring programs can be quickly created in a user-guided function. Automatic function for the selection of cutoff and measuring path according to standards (patented)
- Different calibration methods are supported (static and dynamic) with specification of parameters Ra or Rz
- Selectable maintenance and calibration intervals
- Many measuring station configurations are possible for each individual application case
- System flexibility due to different options
- Different user levels protect from erroneous use of the unit and ensure that unauthorized users cannot operate the device

### Software

#### **General software options**

- Option - Dominant waviness (WDc) for MarWin
- Option - Parameters ISO 13565-3
- Option - QS-STAT / QS-STAT Plus
- Option - Profile processing
- Option - User-defined parameters
- Option - Contour 1 for MarSurf XR 1 / XR 20 (in connection with drive unit MarSurf SD 26)
- All options on one MLK (Mahr License Key)

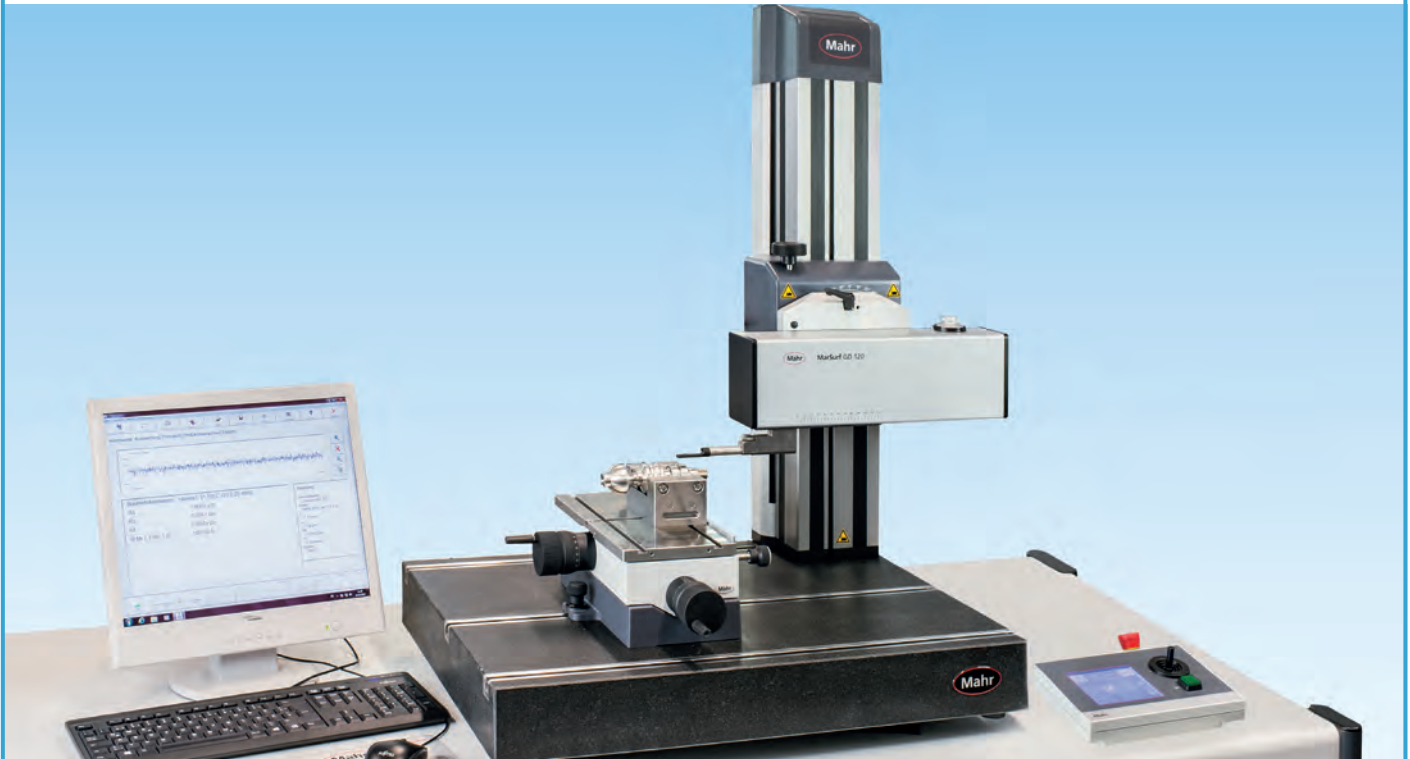
#### **Software options**

- Option - Extended evaluation
- Option - Multiple measurements
- Option - Measuring record extensions
- Option - Integration of script programs
- Option - Digital I/O set



## MarSurf XR 20

Roughness and waviness measurement made easy



### Description

**MarSurf XR 20** is the perfect unit for moving into top-flight surface metrology. This PC-based unit supplies all the common parameters and profiles in accordance with international standards, both in the inspection room and on the shop floor. The high-performance **MarSurf XR 20** is the fruit of decades of surface metrology experience combined with forward-looking technology, clear symbols and straightforward operating aids.

### Features

- Over 100 parameters may be selected for R, P and W profiles as per ISO / JIS / ASME or MOTIF (ISO 12085)
- Tolerance monitoring and statistics for all parameters
- Fast creation of Quick & Easy measuring programs using Teach-in mode
- Comprehensive logging
- Automatic function for selecting standard-compliant selection of filters and traversing lengths (patented)
- Support for different calibration methods (static / dynamic) with specification of Ra or Rz parameter
- Adjustable servicing and calibration intervals
- Simulation mode to help users familiarize themselves with the system quickly
- Numerous measuring station configurations for customized applications

- Different user levels can be set up
- Flexible system thanks to various options and creation of customer-specific parameters
- Different user levels protect unit from operator error and ensure that no unauthorized users are able to operate the device

### Accessories, Software Options

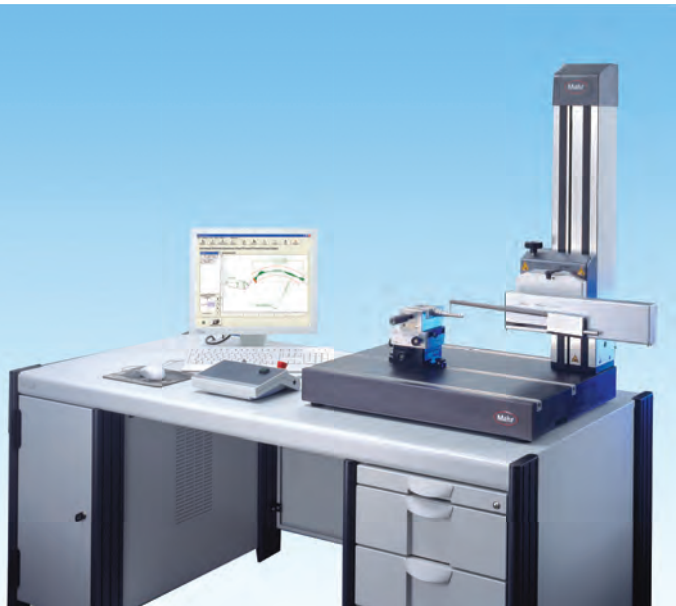
- Connection options for Mahr **GD 25**, **GD 120** drive units
- Software options
  - QS-STAT / QS-STAT plus
  - Dominant waviness
  - User defined parameters
  - Topography



WebCode 2997

## MarSurf XC 2

For entry-level, high-precision contour measurement



### Features

- Creates regression straight lines and circles
- Creates points, intersection points, free points, center points, maximum and minimum points
- Determines radii, distances, angles, coordinates and line form deviations
- Performs nominal/actual comparisons
- Tolerance monitoring
- Associative elements, i.e. immediate change of variables dependent on reference elements when changes occur
- User access rights using password protection prevents incorrect operation
- Excellent calibration procedure thanks to many years' experience, i.e. including geometry calibration, measuring force calibration, bend compensation, etc.
- Stability and rigidity of the probes
- The drive unit is very smooth-running, highly stable and extremely accurate

### Description

Measuring and evaluating geometries of workpieces and tools that are relevant for correct functioning is one of the primary requirements of research, technology and industry. The fast, straightforward and cost-effective 2D contour measuring system is increasingly winning out over other systems. The tried-and-tested, user-friendly **MarSurf XC 2** is the best example of this. Not only does it meet all requirements in terms of accuracy and different evaluation criteria, it also delivers reliable results time after time.

### CD 120 Drive Unit

The **CD 120** drive unit has a patented probe arm mount for fast and flexible changing of probe arms without the need for tools. The calibration data for each probe arm is stored separately. It is also easy to calibrate several identical probe arms.

### Features

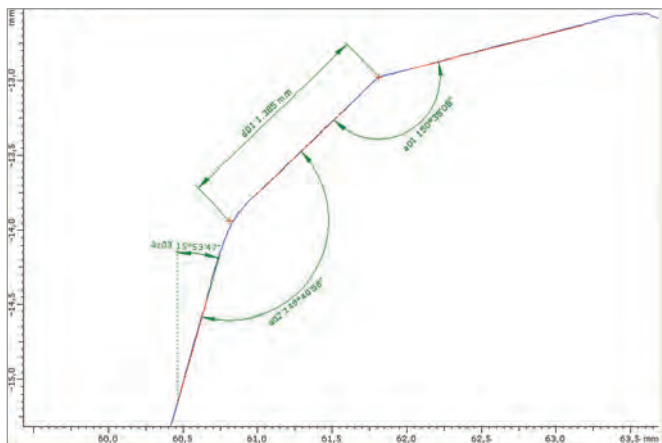
- Max. measuring range of 120 mm (4.72 in) measuring length and 50 mm (1.97 in) measuring stroke
- Automatic lifting and lowering of the probe arm with adjustable speed
- Variable setting of measuring force from 1 mN to 120 mN
- High positioning speed
- Collision protection thanks to patented probe arm mount

The **MarSurf XC 2** can also be delivered optionally with the drive unit **PCV 200**.

### Software

Software options:

- QS STAT / QS STAT plus
- Tangential elements
- Tangential elements (only XC 2)
- Topography



WebCode 2698

## MarSurf XC 20

The new generation of contour measurement systems

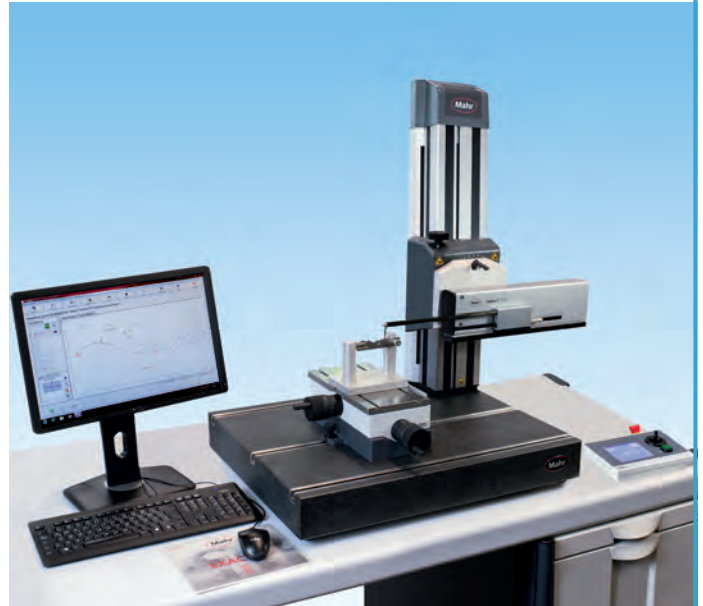
### Description

When it comes to contour evaluation, **MarSurf XC 20** is simply the best. What started over 30 years ago with the Conturograph – consisting of a drive unit and x-y plotter – has today developed into a state-of-the-art contour measurement system with the very latest technology. This perfectly coordinated configuration of instruments meets the highest performance standards. Both the drive unit and the measuring stand are controlled and positioned using the reliable measurement and evaluation software.

### Features

In addition to the functions of the **MarSurf XC 2** entry-level unit, **MarSurf XC 20** also provides additional features:

- Notes on the operating sequence can be displayed
- Interactive control elements support evaluations and automatic operating sequences
- Measurement of upper and lower contours with "twin stylus probe"; these contours can also be evaluated in relation to each other
- Creation of profile sections with evaluations of different parameters for each section
- Segmented measurement across obstacles such as bores or steep sides is possible
- Import of DXF files for nominal/actual comparison
- **PCV 200** drive unit with patented probe arm mount allows tool-free, reproducible changeover of probe arms
- Flexibility measuring station thanks to patented probe system
- Manual, freely variable tracing forces also support flexibility
- Synthetic creation of nominal profiles from straight lines and arcs
- Straightforward comparison of nominal and actual profiles. Several ranges can be defined within a measured profile and each of these ranges can be assigned a different tolerance and different evaluations



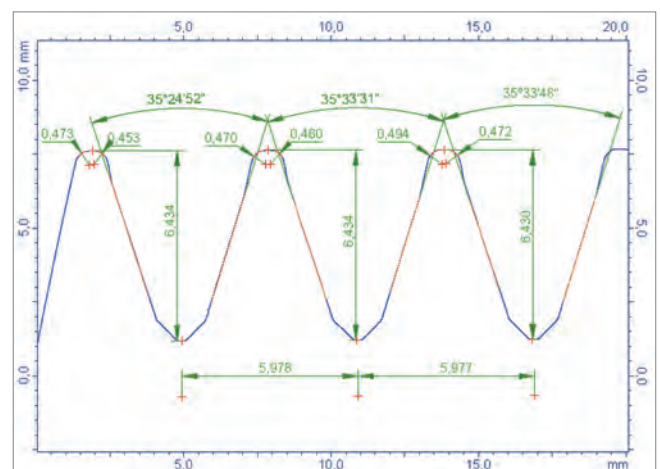
### Software

Software options:

- QS STAT / QS STAT plus
- Thread evaluation
- Topography XT 20
- Topography XT incl. MfM
- Topography XT incl. MfM plus



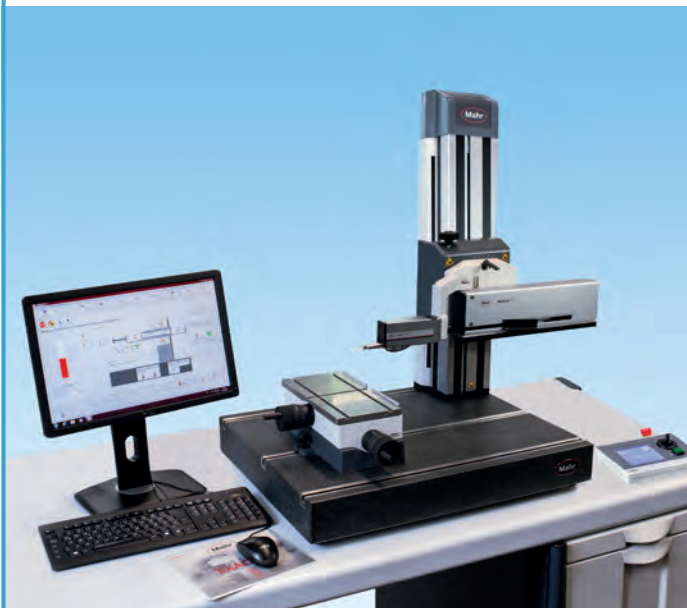
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## MarSurf XCR 20

The new generation of combined roughness and contour measurement systems



### Description

**MarSurf XCR 20** is ideal for combining contour and roughness depth evaluation.

**MarSurf XC 20 + MarSurf XR 20 = MarSurf XCR 20**

This system includes absolutely everything you need, saving both time and space. There are separate user interfaces for the roughness and contour software. **MarSurf XCR 20** is Mahr's top surface measurement system and enables even semi-automated operating sequences to be performed.

### Features

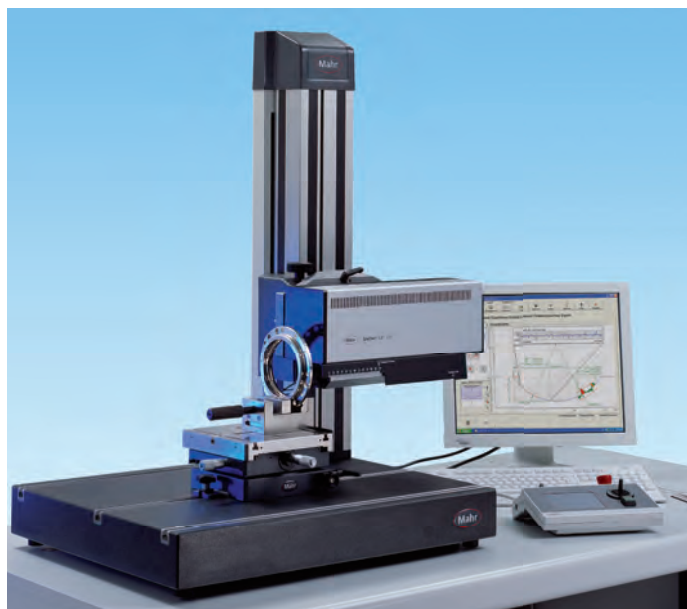
- Saves space because both drive units (**MarSurf PCV 200** contour drive unit and **GD 25** roughness drive unit) can be adapted using the corresponding combi-mount on the **ST 500** or **ST 750** measuring stand
- Roughness and contour evaluations possible from a single measurement
- High-precision contour and roughness evaluation with the **MarSurf UD 120** measuring system on components requiring a large stroke and very high resolution
- Option of rapidly switching between roughness and contour measurements thanks to straightforward changeover within the software platform and changing of mechanical components such as drive unit and probe.

### Versions

- Combi-measuring station with one measuring stand and two drive units (**PCV 200** and **MarSurf GD 25**)
- Combi-measuring station with quick-change mounts (**GD 120**, **PCV 200**)
- **MarSurf UD 120** enables high-precision contour and roughness evaluation on components



WebCode 3152



## MarSurf UD 120 / LD 130 / LD 260

Two in one. Contour and roughness depth measurement in a single stroke

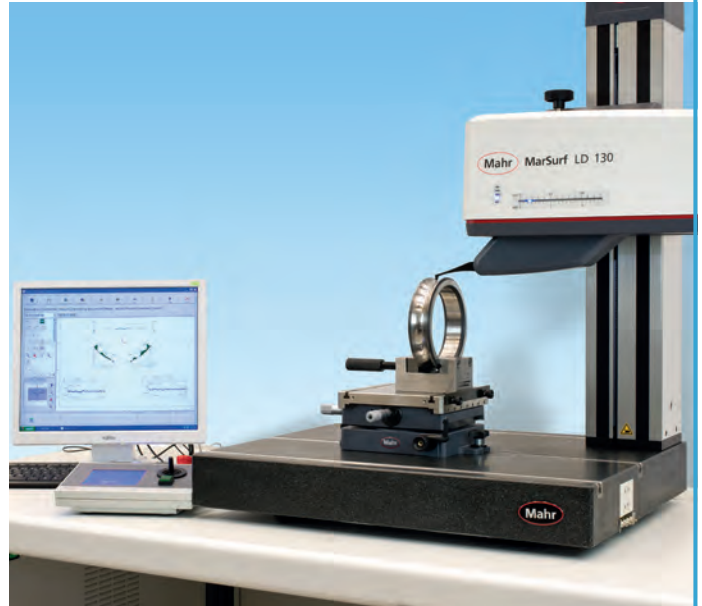
### Description

#### MarSurf UD 120 / LD 130 / LD 260. The step into a new dimension

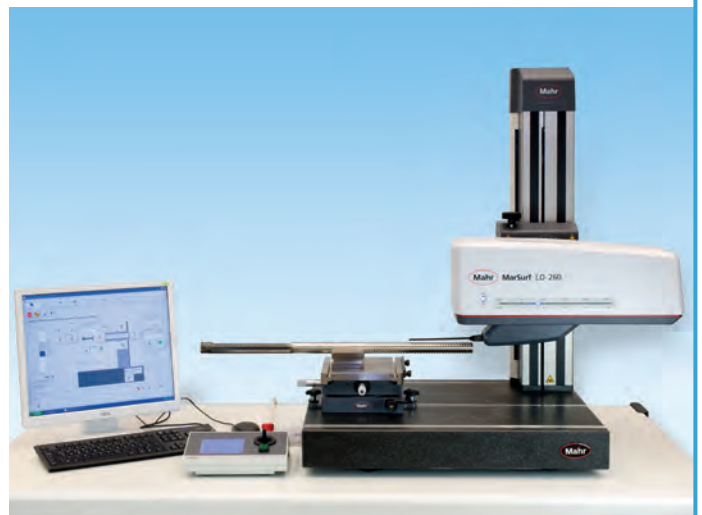
Combining contour and roughness measurements "in one stroke" can be excellently solved with the leading technology of Mahr measuring units. The measuring stations MarSurf UD 120, LD 130 and MarSurf LD 260 are characterized by consistent further development and integration of experiences gained from the first generation of units.

### Features

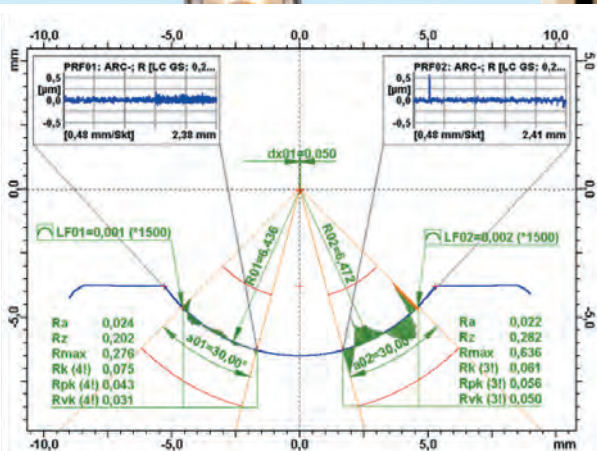
- Large measuring range 130 /260 mm
- Roughness and contour in one measurement
- High measuring and positioning speed greatly minimizes measuring time
- Innovative probe system solution
- Faster and secure exchange of probe arms with simultaneous probe arm recognition by the magnetic holder
- Long measuring path up to 260 mm (MarSurf LD 260) for a measuring stroke of 13 mm (and 100 mm probe arm length) or 26 mm (for 200 mm probe arm length)
- Service-friendly due to modular construction
- Maintenance possible without complete disassembly of measuring stand
- High measuring and positioning speed



MarSurf LD 130



MarSurf LD 260



### Versions

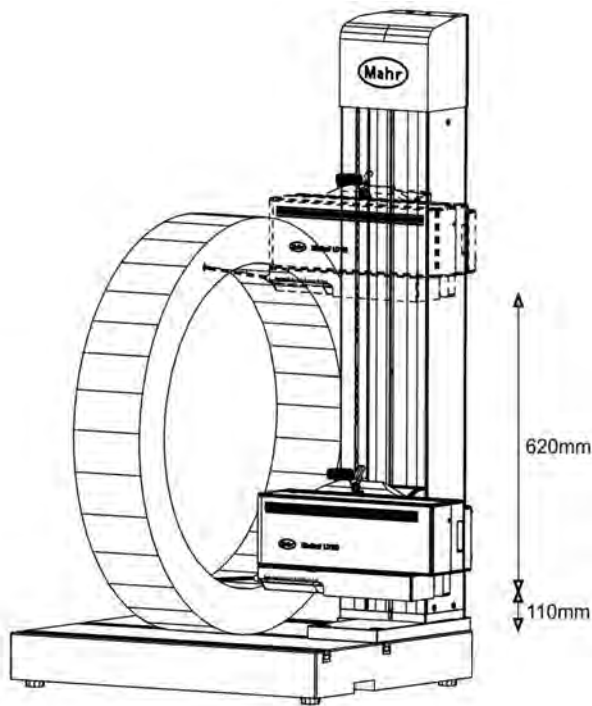
#### MarSurf UD 120 with measuring stand

Entry into the world of high-precision roughness and contour metrology by means of an integrated optical tracing system.



WebCode 3162

## MarSurf Measuring Stand ST 750 D. Measuring Contours in New Dimensions



Sketch: UD 120 with ST 750 D

### Description

Contour metrology from Mahr has been successfully used by hundreds of customers worldwide for decades. Due to many excellent customer solutions, many of them patented, contour metrology has undergone many important developments.

Mahr was the first manufacturer of contour metrology offering the possibility of measurements with a twin stylus with simultaneous switching of the measuring force. This makes it possible not only to measure contours in one tracing direction but also to perform upside down measurements, thus enabling pairs of opposed profiles to be recorded and set off against each other, for diameter measurements, for example.

Today we are proud to present to you a decisive development that builds upon these possibilities.

In connection with the measuring stand **MarSurf ST 750 D**, the measuring stations UD 120 as well as XC 20 CNC can use the entire measuring length of 620 mm of the vertical axis.

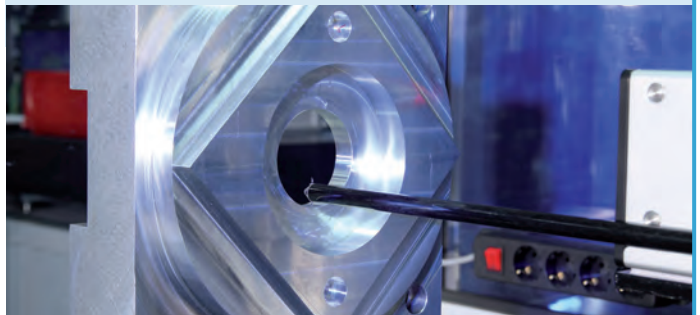
The greatly expanded measuring and evaluation possibilities result from the following basic principle and measuring procedure.

1. Measurement of the lower contour range "measuring force below"
2. Moving the slide on the measuring stand in the upper position.
3. Measuring the upper contour range "measuring force above"
4. Evaluation (distance, diameter) of the two profiles related to each other

By using a twin-stylus probe arm and the UD 120 / LD 130 / LD 260 or PCV drive unit, the individual contour areas are measured using a measuring program. After the geometries of the upper side of the ring have been measured, the slide of the measuring stand moves the drive unit down by the diameter range of the workpiece. Now the geometries of the lower side of the ring are measured.

An exact computation of the travel path of the slide on the measuring stand enables the reference dimensions of the upper and lower contour to be related to each other.

This enables the measurement of diameters, distances and contours in the range up to 620 mm.



### Technical Data

|                           |                                                                   |
|---------------------------|-------------------------------------------------------------------|
| Positioning length:       | 620 mm (deepest position approx. 110 mm above the granite plate)  |
| Traversing length:        | 620 mm                                                            |
| Working temperature       | 21°C ±1° K <sup>1)</sup>                                          |
| Accuracy                  |                                                                   |
| with UD 120/LD 130/LD 260 | MPE ±(1.4 + L/100) μm<br>L = measuring length in mm <sup>2)</sup> |
| with PCV                  | MPE ±(2.5 + L/100) μm<br>L = measuring length in mm <sup>3)</sup> |
| Workpiece weight:         | Up to 90 kg with XY table CT 200                                  |

1) A deviating working temperature can lead to a deviation in accuracy

- 2) With probe arm  
3) With probe arm

item no. 6852008  
item no. 9045820



## MarSurf LD 130 Aspheric / LD 260 Aspheric

High-precision 2D / 3D Measuring Station for Measurement and Evaluation of Optical Components



### Description

An increasingly more compact and favorable system design is demanded on optical systems such as zoom lenses, optics for DVD drives and lenses in the cameras of mobile phones, for example. For this purpose, in addition to classic spherical lens shapes (sphere-shaped), the optics industry is increasingly producing aspherical (not sphere-shaped) lenses.

The evaluation program serves to analyze measurements on spherical surfaces with Mahr contour measuring units. Measured profiles are imported, the nominal form of the aspheres are defined and the residual error is determined compared to the nominal form.

The data of the determined differential profile is made available in a machine-readable format for readjustment of the processing machine (closed loop).

In comparison to the laser interferometer, the tactile measuring technology also allows 2D and 3D measurement of optically rough surfaces, so that testing and correction is possible already early on in the production process (grinding).

### Measuring Principle

For a 3D measurement, first two parallel linear profiles offset by 90° are measured across the zenith of the asphere. Secondly, several concentric circular profiles are gathered by turning the C-axis. These measured points are used to create the topography.

As the probe arms can be positioned automatically, i.e. lifted-off and contact, even discontinuous surfaces, e.g. with a hole in the center, can be measured.

The use of the machine in a vibration-damped enclosure keeps ambient influences such as vibrations and impurities away from the measuring object.

### Asphere Definition

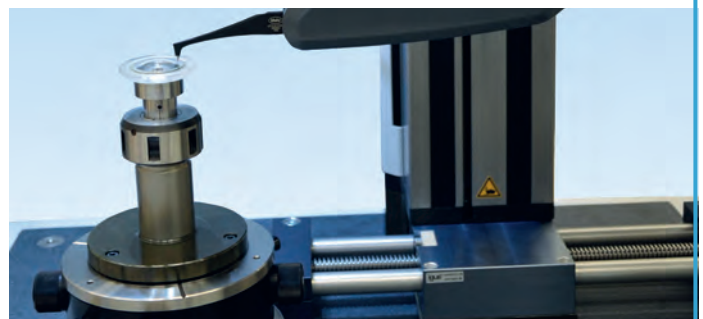
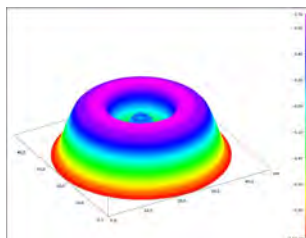
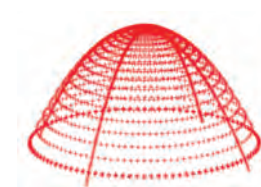
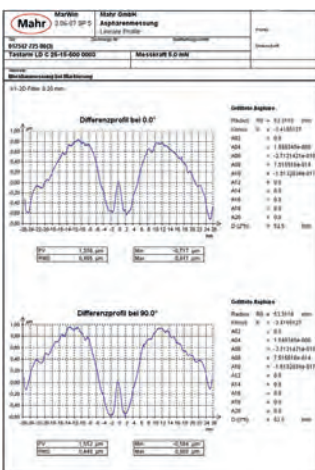
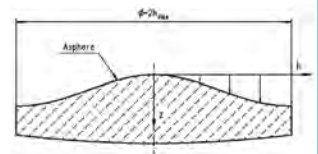
An aspherical surface is a refracting or reflecting surface which deviates from a spherical surface.

The mathematical description of the sagitta Z (dependance of the vertical height to the horizontal coordinates) of aspherical surfaces based on a conical section is given in the following equation:

$$z(h) = \frac{h^2}{R_0} + \sum_{n=2}^5 A_{2n} \cdot h^{2n}$$

$$1 + \sqrt{1 - (1 + k) \left( \frac{h}{R_0} \right)^2}$$

$R_0$  = Radius of curvature  
 $h$  = Radius of the area of application of the asphere  
 $k$  = Conical constant  
 $A_i$  = Aspheric coefficients





## MarSurf Data Overview XR 1 / XR 20



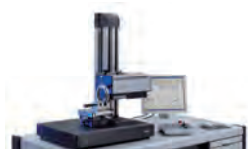
**MarSurf XR 1**



**MarSurf XR 20**

|                        |                                                                                                                                                   |                                                                               |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| Parameters             | Over 80 parameters for R-, P-, W-profiles as per current standards ISO/JIS or motif (ISO 12085)                                                   | Over 100 roughness, waviness, P-profile and motif parameters                  |
| Probe                  | BFW skidless probes system with drive unit MarSurf SD 26 and/or skidded probe system PHT with drive unit MarSurf RD 18                            | MFW 250, R probe                                                              |
| Drive Unit             | Skidless tracing - BFW-250 probe, skidded tracing - <b>RD 18, RD 18 C, RD 18 C2</b>                                                               | Usable GD 25, GD 120                                                          |
| Traversing length      | <b>SD 26:</b> automatic; 0.56 mm; 1.75 mm; 5.6 mm; 17.5 mm; 56 mm; measure to stop; variable<br><b>RD 18:</b> automatic; 1.75 mm; 5.6 mm; 17.5 mm | Depending upon drive unit 0.56 / 1.75 / 5.6 / 17.5 / 56; Lt var 0.56 to 120.0 |
| Measuring range        | <b>SD 26:</b> $\pm 250 \mu\text{m}$<br>(with double probe arm length $\pm 500 \mu\text{m}$ )<br><b>RD 18:</b> $\pm 350 \mu\text{m}$               |                                                                               |
| Measuring force (in Z) | 0.7 mN                                                                                                                                            |                                                                               |
| Resolution (Z)         | $\pm 25 \mu\text{m} / 0.7 \mu\text{m}$ ; $\pm 250 \mu\text{m} / 7 \mu\text{m}$ ; $\pm 2500 \mu\text{m} / 50 \mu\text{m}$                          | $\pm 25 \mu\text{m} = 0.5 \text{ nm}$ ; $\pm 250 \mu\text{m} = 5 \text{ nm}$  |

## MarSurf Data Overview UD 120 / LD 130 / LD 260



**MarSurf UD 120**



**MarSurf LD 130 / LD 260**

|                                              |                                                                            |                                                                            |
|----------------------------------------------|----------------------------------------------------------------------------|----------------------------------------------------------------------------|
| Parameters                                   | Roughness parameters, waviness parameters, P-parameters, see MarSurf XR 20 | Roughness parameters, waviness parameters, P-parameters, see MarSurf XR 20 |
| Contour elements                             | Radii, distances, angles, see MarSurf XC 20                                | Radii, distances, angles, see MarSurf XC 20                                |
| Probe                                        | LP D 14-10-2/60                                                            | LP D 14-10-2/60<br>LP D 14-10-500                                          |
| Drive unit                                   | MarSurf UD 120                                                             | MarSurf LD 130 / MarSurf LD 260                                            |
| Traversing length                            | 0.1 mm to 120 mm                                                           | 0.1 - 130 mm / 0.1 - 260 mm                                                |
| Measuring range                              | 10 $\mu\text{m}$                                                           | 13 mm (100 mm probe arm)<br>26 mm (200 mm probe arm)                       |
| Measuring force (in Z)                       | 1 mN to 30 mN                                                              | 0.5 mN to 30 mN, can be set by software                                    |
| Resolution (Z)                               |                                                                            | 0.8 nm                                                                     |
| Positioning speed                            |                                                                            | 0.02 mm/s up to 200 mm/s                                                   |
| Residual value when $v_t = 0.1 \text{ mm/s}$ |                                                                            | $R_z0 \leq 20 \text{ nm}$<br>$R_q0 \leq 1 \text{ nm}$ , typical            |

## MarSurf. Data Overview XC 2 / XC 20



**MarSurf XC 2 / XC 20**

|                             |                                                                                                                                                                                                                                                |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Parameters                  | Radii, angles, distances, coordinates, fitting in of regression straight lines, best-fit circles, circle sections. Defining points, circles and circle sections and much more. Multiple measurements, double contours, DXF import (only XC 20) |
| Probes                      | 350 mm probe arms, 175 mm probe arms complete with probe stylus tips                                                                                                                                                                           |
| Drive unit                  | MarSurf CD 120 / MarSurf PCV 200 (only XC 20)                                                                                                                                                                                                  |
| Traversing length           | 1 mm to 120 mm, 1 mm to 200 mm (only XC 20)                                                                                                                                                                                                    |
| Measuring range             | ± 25 mm with 350 mm probe arm                                                                                                                                                                                                                  |
| Profile resolution          | 350 mm probe arm = 0,5 µm; 175 mm probe arm = 0,25 mm                                                                                                                                                                                          |
| Measuring force (in Z)      | 1 mN to 120 mN, variably adjustable                                                                                                                                                                                                            |
| Dimensions (L x B x H)      | Approx. 700 mm x 550 mm x 720 mm (of compl. meas. stand ST 500)                                                                                                                                                                                |
| Weight of measuring station | Approx. 140 kg (with ST 500 meas. stand)                                                                                                                                                                                                       |
| Power supply                | 230 V (or 115 V possible)                                                                                                                                                                                                                      |

## MarSurf WM 100 / CWM 100. Data Overview

**WM 100**



**CWM 100**



|                     |                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                      |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Measuring principle | Interferometric, white light-interferometric light source (WLI): high-performance-LED, 505 nm                                                                                                                        | Interferometric, white light-interferometric and confocal light source (KFM and WLI): high-performance-LED, 505 nm                                                                                                                                                                                                                   |
| Measuring range     | Sensor unit can be manually moved over 200 mm manually in Z<br>Object table can be manually moved in X and Y<br><br>Interferometer, white light-interferometric:<br>Measuring range (WLI): up to 100 µm (vertically) | Sensor unit movable 100 mm in Z, CNC-controllable<br>object table movable 100 mm in X and Y, CNC-controllable<br><br>Interferometer, white light-interferometric light source (WLI): up to 4 mm (depending upon lens)<br><br>Confocal microscope: Measuring range (KFM): up to over 800 µm (depending upon resolution in Z and lens) |

## MarSurf FP 40 / 180. Data Overview



**MarSurf FP 40 / MarSurf FP 180 / Planar**

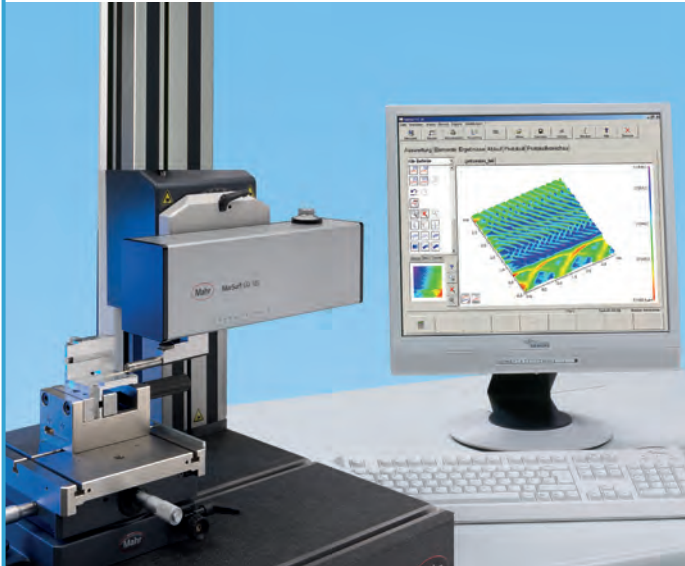


**MarSurf FP 40 / MarSurf FP 180 / Volumen**

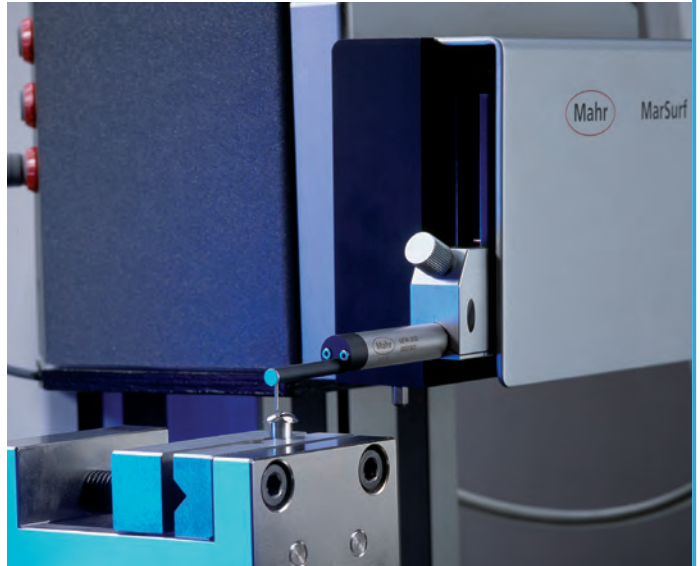
|                                            |                                   |                              |
|--------------------------------------------|-----------------------------------|------------------------------|
| Area of use                                | 2.5D objects                      | Complex 3D objects           |
| Measuring concept                          | Phasogrammetry, Fringe projection | Multi-view fringe projection |
| Measuring field                            | Ø 40 mm / Ø 180 mm                | Ø 40 mm / Ø 180 mm           |
| High measuring volume                      | 10 mm / 35 mm                     | 15 mm / 50 mm                |
| Observation field                          | Ø 40 mm / Ø 180 mm                | Ø 40 mm / Ø 180 mm           |
| Measuring uncertainty                      | 2 µm / 5 µm                       | 5 µm / 25 µm                 |
| Measuring point distance                   | 45 µm to 50 µm / 150 µm to 200 µm | 25 µm / 80 µm                |
| Partial views                              | 1                                 | N: 1–24                      |
| Measuring points per position (max.)       | 1.5 million                       | N x 1.5 million              |
| Measuring time                             | 30 s to 200 s                     | N x (30 to 60)s              |
| Detectable inclination angle on the object | Up to 40°                         | Under cuts up to 110°        |

## MarSurf XR 20 with Topography XT 20

Upgrade to a powerful topography measuring station



3D measurement of molds for use in the medical industry



### Description

For some applications, a single tactile profile of the surface form is inadequate. 3D topographic representation and evaluation offers the opportunity to obtain more comprehensive profile information. The **MarSurf XR 20** measuring station can be turned into a topography measuring station both simply and cost-effectively, whether based on an order or an upgrade requirement. All that is needed in addition to the standard scope of delivery is a **CT 200-MOT Y-drive** for the **CT 200** XY table and the **MarWin XT 20 software**.

### Description

In the case of molds for items such as contact lenses, the surface topography is also of interest in addition to the individual profile for determining the roughness depth. The form and surface roughness depth over the entire topography range are critical when it comes to product function.

### Measuring Station Components

As described on pages 15-17 to 15-21, plus:

**Topography measuring station extension**

**MarSurf XT 20 software**

**Order No. 6299034**

**CT 200-MOT Y-drive**

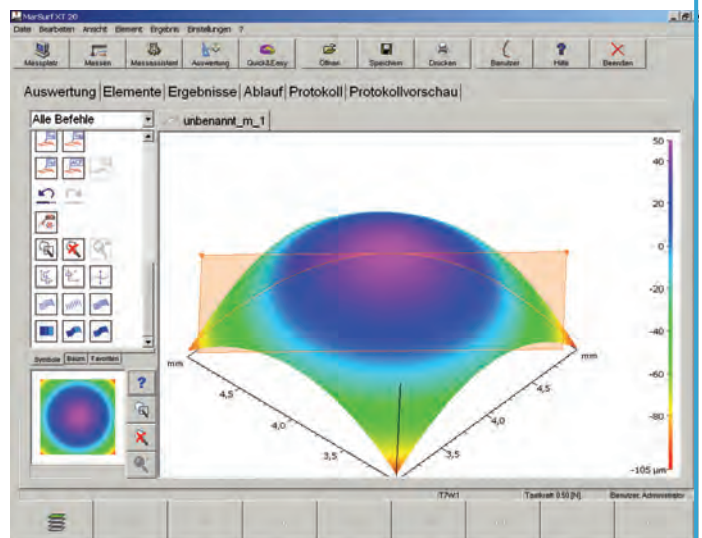
**Order No. 6710543**

### CT 200-MOT Technical Data

**CT 200-MOT** technical data as for CT 200 but with motorized Y-drive.

Adjustment path in Y  
Resolution

17.5 mm (0.7 in)  
0.375  $\mu\text{m}$  (15  $\mu\text{in}$ )





## MarSurf CNC modular

### Description

Beginning with a standard surface measuring station, by adding additional table axes and a measuring enclosure it can be turned into a convenient, semi-automatic CNC measuring station.

- Plug and play configuration between control
- Easy to operate via MarSurf
- "Clever" universal concept for workpiece mounting and clamping
- Minimal training required

#### Delivery scope:

- Measuring station MarSurf XR 20 with GD 120
- alternatively: Measuring station MarSurf XC 20 with PCV
- alternatively: Measuring station MarSurf LD 130/LD 260
- Including midrange control CNC
- Measuring stand MarSurf ST 500 / 750 CNC
- Manual control panel MCP 21

#### Optional table axes

- T1S-L linear axis 200 mm
- T1S-R rotational axis
- T3S-LLR 3 table axes consisting of 2 linear and one rotational axis

#### Optional measuring enclosure

#### Accessories:

**Table plate** with clamping ball adapter and universal clamping plate.

Upgrade from a standard measuring station to MarSurf CNC modular



### Technical Data



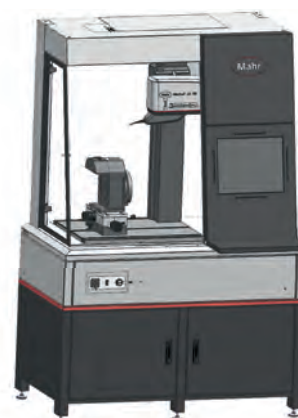
**T1S-L** linear axis  
Including control module for midrange CNC  
Adjustment range 200 mm  
Dimensions 510 mm x 200 mm x 200 mm  
Load 50 kg



**T1S-R** rotational axis  
Including standard mounting plate and control module for midrange CNC  
Usable as TA- or TC-axis  
Dimensions 270 mm x 200 mm x 210 mm  
Load 30 kg



**T3S-LLR** 3-axis combination  
Including standard mounting plate and control module for midrange CNC  
Multi-axis, monolithic construction from the axes TX-TY-TC  
Load 30 kg



### Applications

#### Measuring on the shop floor

- Palette measurements
- Topography measurements
- Multiple measuring points on one part without reclamping
- Automatic alignment of the X-axis
- Universal measuring station for various measuring tasks
- Automatic zenith search

## MarSurf CNC *premium*



### Description

The MarSurf CNC concept offers the high quality solution in fully automatic production processes for roughness depth and contour measurements.

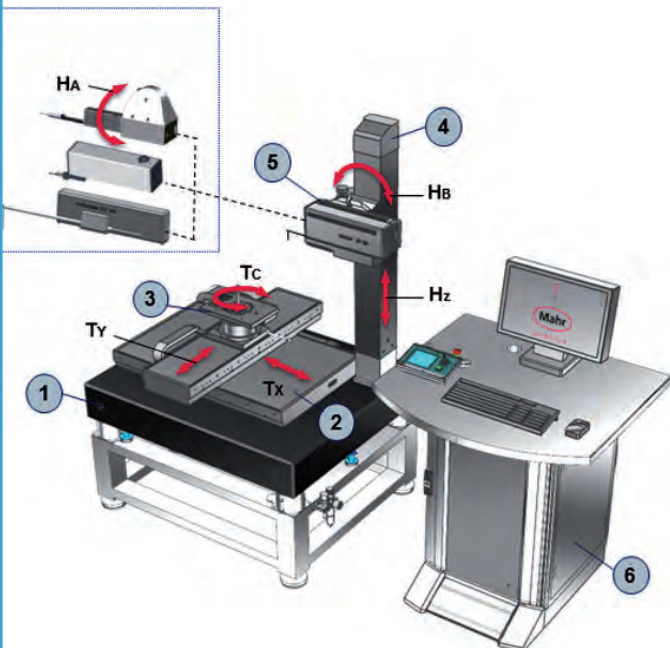
With this measuring station concept, Mahr has set standards worldwide. Complex measurement tasks can be performed reliably and process-safe fully automatically without operator influence. In conjunction with the probe arm changing unit, fully automated processes are possible even in complex diverse measurement tasks without operator influence by manual probe arm exchange.

A coordinated component program from various motorized table and auxiliary axes as well as the proven drive units and probe systems are the ideal basis for an optimal solution.

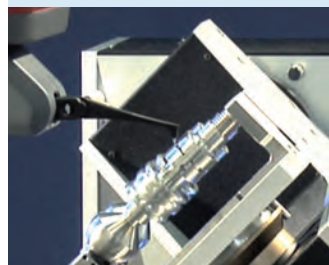
With the Mahr software platform MarWin you are using a sophisticated, modular, cross-product control and evaluation system that provides the necessary flexibility and process reliability especially for CNC operation.

### Probe arm changing unit TWE

Up to 10 different LD probe arms can be changed fully automatically.



- Basic measuring station
1. Base with regulation (pneum.)
  2. Table axes
  3. Adapter plate
  4. Measuring column
  5. Drive unit, adapted to the measuring task
  6. Work station with accessories



### Your advantages with MarSurf CNC *premium*

- Universal machine concept for the automatic measurement of workpiece contours and roughness depths
- Based on the size of the workpiece, the workpiece weight and the geometry, appropriate models and an optimally suited table and auxiliary axes system provide the basis for the measuring station configuration.
- An environmentally-suited enclosure system including the necessary security modules is available
- In addition to the manual workpiece loading, an automatic loading station can be configured

### Application

#### Automotive industry

- Injection technology components
- Motor parts: cylinder heads, cylinder block, crankshaft, camshaft, conrod
- Automatic transmission
- Rack/steering nut
- Brake system components



## MarWin Software

### Description

The software platform MarWin gives the user the possibility to use a service that is characterized by ease of operation and various measuring and evaluation criteria. Standardized symbols, clearly structured operation processes even for different applications, a explicit regulation of user rights, are only some of the many features that make it easier for the user.

Operation is made easier with clearly recognizable symbols. Since many operators create measuring procedures according to their own priorities, symbols can be selected as favorites. Help can be activated for the selected symbol at any time.

The setting of the measurement conditions, the positioning of the probe in the "loading position" as well as measuring position and the positioning after the measurement together with all conditions are configured in the "measuring assistant".

Multiple measurements, notes during a measurement procedure and much more are provided in easily manageable operation procedures.

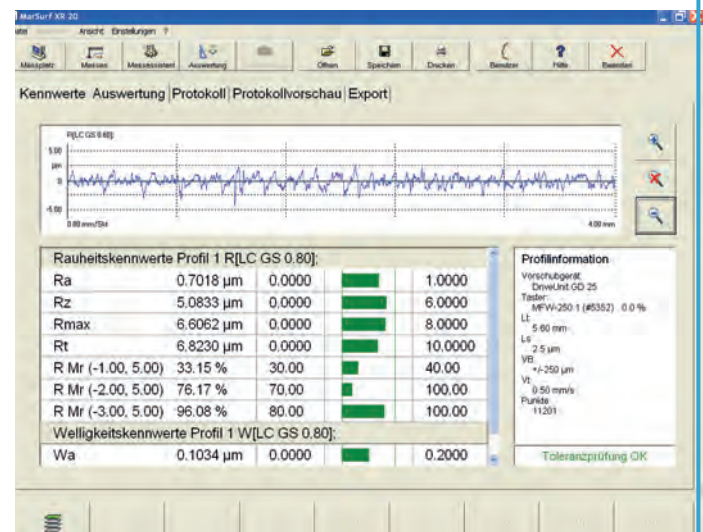
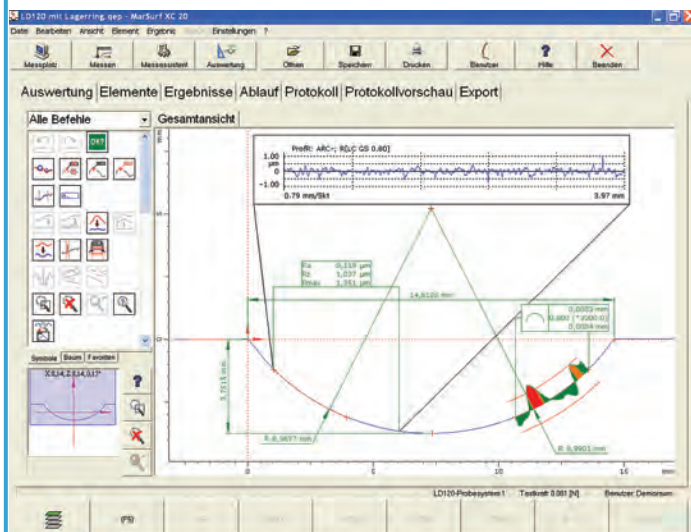
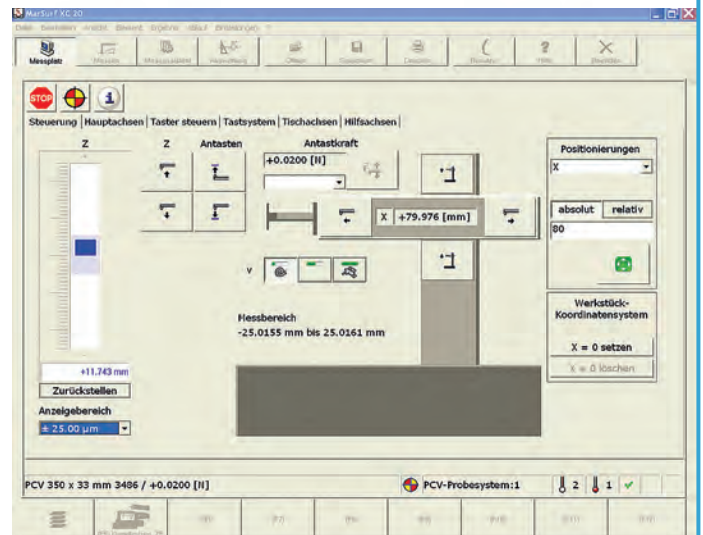
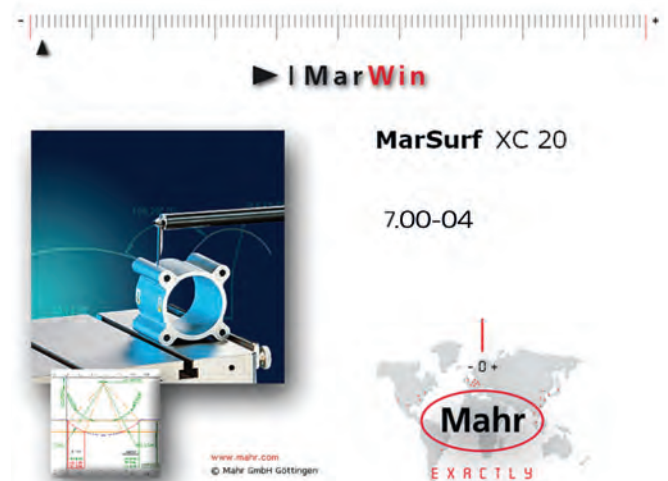
### Top technology even in the software

Years of further development of the contour-roughness depth software and topography software with the possibility to select additional interesting options give the user access to one of the most high performing platforms worldwide.

Thanks to an easily understandable user interface, the steps of the measuring and evaluation procedures can be carried out quickly and in a user-friendly manner.

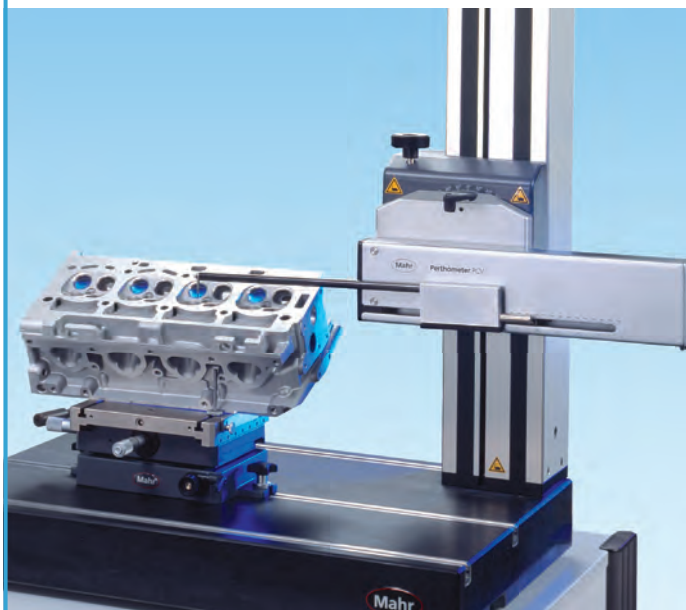
### Expansion options

like Data Export QS STAT, Thread Evaluation and others are available.



## MarSurf PCV 200 Drive Unit

Contour drive unit



### Description

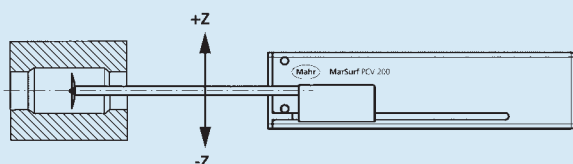
The **PCV 200** contour drive unit supports measuring paths of up to 200 mm (7.87 in).

Many contour measurement tasks, e.g. calculating double contours using the twin stylus, can be performed in conjunction with the **MarSurf XC 20** software.

### Features

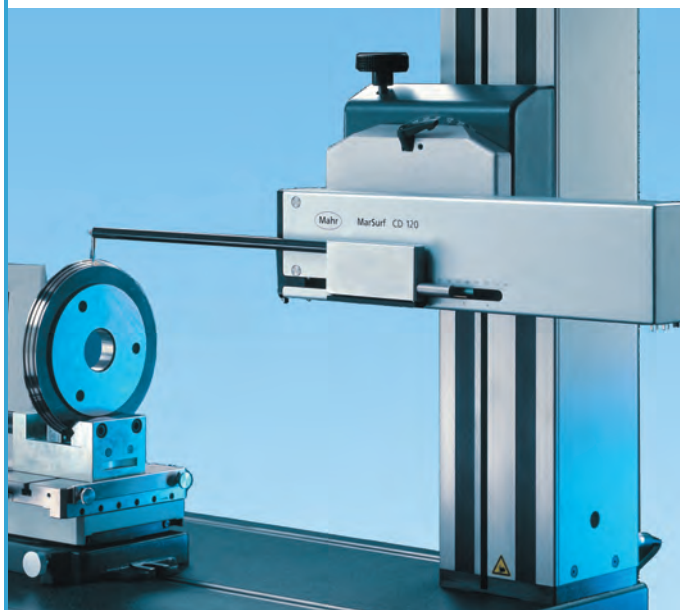
- Probe arm collision protection thanks to patented probe arm mount
- Programmed measuring run with lifting and lowering of the probe arm and positioning
- Selection of different measuring speeds ranging from 0.2 mm/s to 4 mm/s (0.008 in/s to 0.16 in/s)
- Variable setting of measuring force from 1 mN to 120 mN
- Measuring force remains constant over the entire measuring range

The drive unit supports a large number of probe arms of different shapes and sizes.



## MarSurf CD 120 Drive Unit

Contour drive unit



### Description

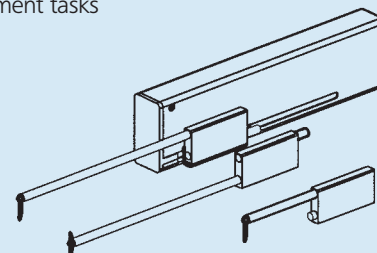
The **CD 120** contour drive unit is based on the technology of the **PCV 200** drive unit. It measures contour elements such as radii, distances, angles, etc. simply and precisely.

In conjunction with the **MarSurf XC 2** software, it constitutes the basic contour measurement unit.

### Features

- Automatic lifting and lowering of the probe arm with adjustable speed
- Probe arms available for bores larger than 2 mm (0.079 in)
- Selection of different positioning speeds ranging from 0.2 mm/s to 10 mm/s (0.008 in/s to 0.39 in/s)
- Variable setting of measuring force from 1 mN to 120 mN
- Patented probe arm mount for reproducible probe arm exchange without the need for tools

The use of complete probe arms, each with their own separately stored calibration data, allows the evaluation system to switch between different measurement tasks quickly and flexibly.





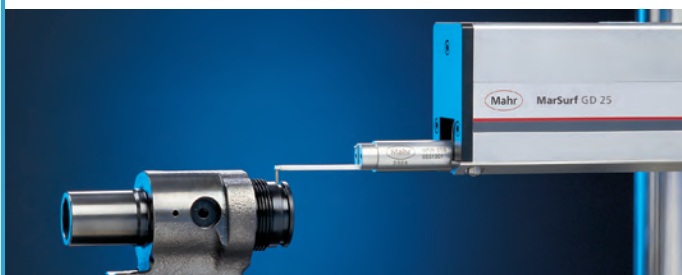
## MarSurf GD 25. Drive Unit

The standard drive unit for surface measurements



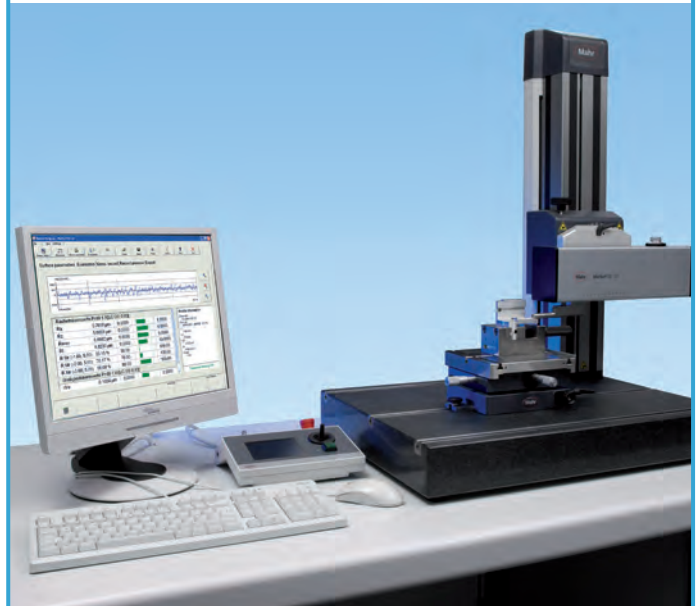
### Description

This unit provides excellent straightness precision and smooth running over a measuring length of 25.4 mm (1 in). A patented motorized height adjustment accessory ensures the probe is positioned in the range of 4 mm (0.15 in) and enables motorized probe zero setting. The MFW 250 B skidless probe can be used along with all probes of the R series.



## MarSurf GD 120. Drive Unit

The high-precision drive unit of the new generation



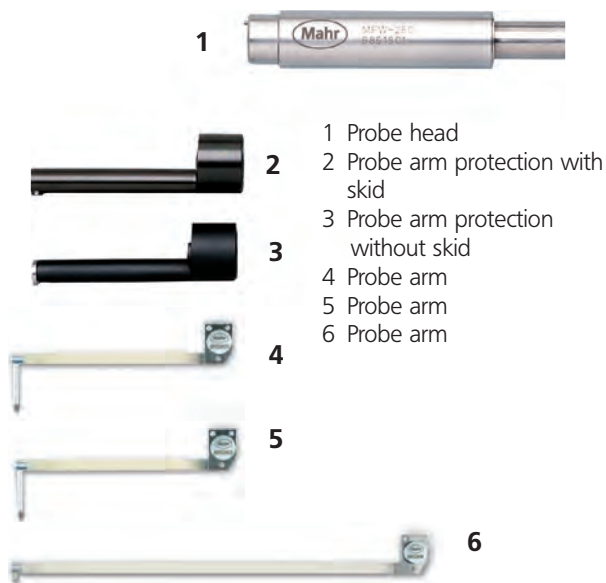
### Description

In addition to high-precision roughness measurements, the **GD 120** drive unit is used for waviness measurements over long traversing lengths of up to 120 mm (4.72 in). Patented motorized probe zero setting over 10 mm (0.39 in) saves both setup work and time. The drive unit optionally supports problematic measuring positions such as transverse or vertical tracing using simple, adaptable probe mounts. The **GD 120** allows precise positioning on the X-axis. In addition to very quiet running (residual value  $R_z < 30 \text{ nm}/0.1 \text{ mm/s}$ ), this unit offers fast probe clamping and also protects the unit by means of a collision protection device on the probe mount.



## MarSurf. Accessories

Probes for virtually any application



### Probe system MFW 250 B

Probe system with magnetic holder principle for probe arms. The MFW probe system can be used as a skidless or skidded probe. It is distinguished by the following characteristics:

- low linearity deviation ( $< 1\%$ ),
- high resolution (100,000-/200,000: 1),
- large measuring range ( $\pm 250\ \mu\text{m}$ ).

Double length tracing arms enlarge the measuring range to  $\pm 500\ \mu\text{m}$ .

The simple tracing arm interchange ensures a particularly wide field of application. The rugged, rigid design avoids natural vibration.

### Accessories

Depending upon the measuring task, different accessory components, parallel vices or prisms can be ordered.

#### XY table CT 300

Table surface 300 mm x 150 mm  
XY-adjustment by 25 mm each using micrometer caliper.  
C-axis adjustable by  $\pm 2.5^\circ$  for highly precise workpiece alignment

**Order No. 6710530**

#### XY table CT 120

for mounting and aligning workpieces.  
Can be adjusted in two coordinates by 15 mm (.591).  
Table surface: 120 mm x 120 mm (4.728 in x 4.728 in) with two brackets.

**Order No. 6710529**

#### PP vee-block

with four different prisms for mounting axis-symmetrical workpieces with diameters from 1 mm to 160 mm.  
Incl. clamping springs for holding light workpieces in the prism.

**Order No. 6710401**

#### PPS parallel vice

for clamping measuring objects

**Order No. 6710604**

#### Parallel vice

for clamping small workpieces  
Jaw width 32 mm  
Dimensions (L x W x H): Approx. 130 mm x 32 mm x 40 mm

**Order No. 6710631**

#### Parallel vice with joint

axis can be swiveled by  $\pm 45^\circ$

**Order No. 6710632**

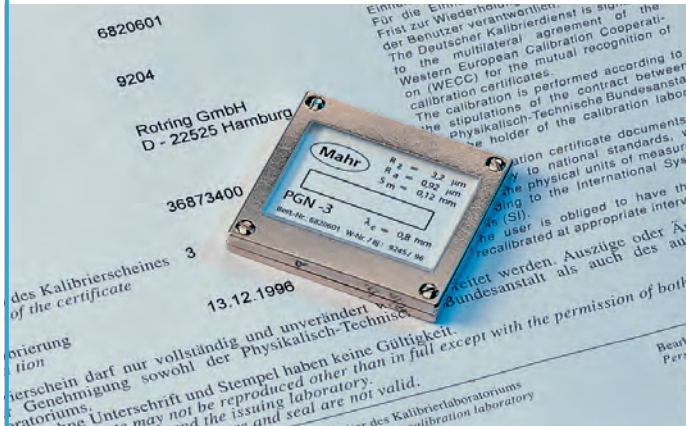
**Parallel vice with angled foot**  
**Order No. 6710633**



WebCode 3991

## PGN Geometric Standard

DIN EN ISO 5436 type C1 sinusoidal groove profile



Surface roughness standard with a sinusoidal groove profile. Profile depth approx.  $3\text{ }\mu\text{m}$  ( $120\text{ }\mu\text{in}$ ), groove spacing approx.  $0.12\text{ mm}$  ( $.00472\text{ in}$ ). For checking the roughness measuring station. The following types are available:

- PGN 1** Profile depth approx.  $1.5\text{ }\mu\text{m}$ , groove spacing approx.  $0.10\text{ mm}$
- PGN 3** Profile depth approx.  $3\text{ }\mu\text{m}$ , groove spacing approx.  $0.12\text{ mm}$
- PGN 10** Profile depth approx.  $10\text{ }\mu\text{m}$ , groove spacing approx.  $0.20\text{ mm}$

DAKs/DKD and Mahr calibration certificate upon request

## PEN 10-1 Setting Standard

DIN EN ISO 5436 type A1 depth setting standard



Depth setting standard for the static calibration of the vertical stroke of all skidless, single-skid and dual-skid probes. Groove depth. approx.  $10\text{ }\mu\text{m}$ ,  $\varnothing 44\text{ mm}$ .

- 2 calibration grooves
- Optical flat surface

DAKs/DKD and Mahr calibration certificate upon request

## PRN 10 Geometric Standard

Turned roughness profile



With Mahr calibration certificate. Roughness standard with turned profile, chromed. Profile depth approx.  $10\text{ }\mu\text{m}$  ( $.394\text{ }\mu\text{in}$ ). For checking the roughness measuring station.  $R_a$ ,  $R_z$ ,  $R_{\text{max}}$ .

## KN 100 Contour Standard

Standard for test contour measuring systems



The contour standard **KN 100** was developed in cooperation with the PTB. Testing for confirmation and acceptance purposes can now be conducted traceable back to the PTB due to concrete reference to realistic geometries. The standard fulfills the requirements of the VDI/VDE guidelines 2629.



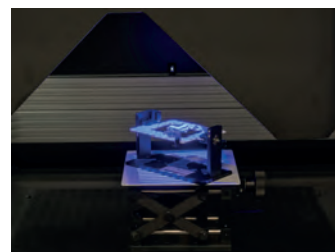
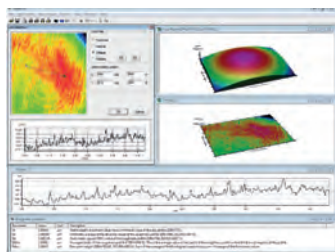
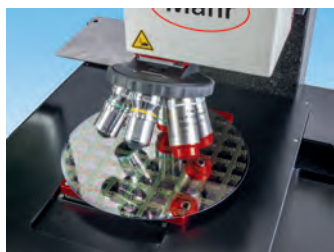
## MarSurf. Optical metrology from Mahr

### 3D measuring systems for surface analyses and component geometries

► | In addition to tactile metrology, optical metrology has become important, especially in recent years. Reasons for choosing visual inspection of workpieces are manifold:

- no damage or deformation on soft or liquid surfaces
- no wear of the sensing elements
- Time gained by area measurements and also evaluation of new standardized area parameters
- Statistically reliable results of heterogeneous surfaces with no clearly defined machining directions
- Fast and complete measurement of component geometries

With Mahr as your metrology partner you get the solution that is right for you. Decades of experience with both tactile as well as optical sensors give you the guarantee to get the reliable results with the suitable device. | ◀



## MarSurf CWM 100

### Description

The high-precision, computer-controlled optical measuring instrument **MarSurf CWM 100** with subnanometer resolution. A combined 3D measurement system consisting of a confocal microscope and white light interferometer.

- Universal suitability for technical, optical and reflective surfaces, and surfaces of printed circuit boards and semiconductors and biological tissues
- 2D surface analysis and measuring evaluation
- Topographic 3D surface analysis and measuring value evaluation
- Fast measurements — short measuring times
- Microscopic image field dimensions, easily extendable with fully automatic stitching process
- Automatic table and object positioning:  
100 mm x 100 mm, longer distance upon request
- Large selection of objectives enables ideal adaptation to the measuring object
- Solid construction with granite base plate and granite column for best vibration damping
- Professional evaluation software based on MountainsMap®

### Delivery scope

- Sensor system, consisting of:
  - Confocal microscope KFM with 6x objective turret
  - Camera 768 pixel x 582 pixel, up to 48 images/s
  - CNC-controlled Z-axis with integrated Heidenhain glass scale
  - WLI software module, software "Inspector"
- Granite base and column with sensor system and CNC-controlled object table
- Motorized multi-axis control for Z-axis and XZ table for sample positioning and image field merging
- Objective 50x0.8 EPI (confocal microscope)
- Objective 20x0.4 DI (white light interferometer)

### Applications

#### Mechanical engineering

Metallic surfaces of all types (ground, rolled, etc.), also laser-textured surfaces, ceramic and plastic surfaces, surfaces of molds

#### Medical industry

Metallic, ceramic and plastic surfaces of implants, prostheses and instruments

#### Electronics industry

Surface analysis of coatings, measurement and analysis of electronic and semiconductor components

#### Optics industry

Form and roughness analysis of diverse optical components (all materials).



### Accessories

#### Tilting table CT 120, biaxial

#### Angle adjustment table $\pm 30^\circ$

#### Set of standards

#### Confocal microscope:

KFM objectives 10x0.5; 20x0.75; 50x0.6 with 11 mm wd; 50x0.8; 100x0.9

#### White light interferometer:

WLI objectives 2.5x0.075; 5x0.13; 10x0.3; 20x0.4; 50x0.55; 100x0.7

### Technical Data

|                     |                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Measuring principle | Interferometric, white light-interferometric and confocal light source (KFM and WLI): high-performance-LED, 505 nm                                                                                                                                                                                                                                                        |
| Measuring range     | <p>Sensor unit movable 100 mm in Z, CNC-controllable<br/>object table movable 100 mm in X and Y, CNC-controllable</p> <p>Interferometer, white light-interferometer light source (WLI):<br/>up to 4 mm (depending upon lens)</p> <p>Confocal microscope:<br/>Measuring range (KFM): up to over 800 <math>\mu\text{m}</math> (depending upon resolution in Z and lens)</p> |

## MarSurf WM 100



### Description

The high-precision optical measuring unit **MarSurf WM 100** subnanometer resolution and measuring accuracy. A 3D white light interferometer measuring system.

- Universal suitability for optical and reflective surfaces, fine technical, surfaces as well as surfaces of printed circuit boards and semiconductors and biological tissues
- 2D surface analysis and measuring evaluation
- Topographic 3D surface analysis and measuring evaluation
- Fast measurements - short measuring times
- Manual table and object positioning in up to 4 axes
- Large selection of lenses enables the ideal adaptation to the measuring object
- Sturdy construction with granite base plate
- Professionelle Auswertesoftware auf Basis von MountainsMap®

### Delivery scope:

- Sensor system consisting of:
  - WLI Sensor head
  - Camera 768 pixel x 582 pixel, up to 48 images/s
  - 100 µm Z-axis with Piezo drive
  - WLI software module, software "Inspector"
- Granite base and column with manual Z-positioning of the sensor system
- Manual XY-objective table for sample positioning
- Objective 20x0.4 DI (white light interferometer)

### Technical Data

|                     |                                                                                                                                                                                                                              |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Measuring principle | Interferometric, white light-interferometric light source (WLI): high-performance-LED, 505 nm                                                                                                                                |
| Measuring range     | <p>Sensor unit can be manually moved over 200 mm manually in Z<br/>Object table can be manually moved in X and Y</p> <p>Interferometer, white light-interferometric<br/>Measuring range (WLI): up to 100 µm (vertically)</p> |

### Accessories

**Tilting table CT 120, biaxial**

**Angle adjustment table  $\pm 30^\circ$**

**Set of standards**

**White light interferometer:**

WLI objectives 2.5x0.075; 5x0.13; 10x0.3; 20x0.4; 50x0.55; 100x0.7

**Vibration damping**

With optional active vibration damping for optimum damping of vibrations for measuring in the nanometer and subnanometer range.

### Applications

#### Mechanical engineering

Fine metallic surfaces of all kinds (ground, rolled, etc.) also laser-structured surfaces, fine ceramic and plastic surfaces, surfaces of molds.

#### Medical industry

Metallic, ceramic and plastic surfaces of implants, prostheses and instruments.

#### Electronics industry

Surface analysis of coatings, measurement and analysis of electronic and semiconductor components.

#### Optics industry

Roughness analysis of diverse optical components (all materials).



## MarSurf FP 40/180

### Description

**MarSurf FP 40/180** optical 3D scanner is used for inspection and measurement of plastic optics, such as auxiliary LED lighting or free-form mirrors. Furthermore, the measurement system is used in the digitization and measurement of diverse injection molds.

With the help of the optical 3D scanner, not only the precise determination of the 3D geometry of components / specimens is possible, but also the optimization of individual processing steps within their manufacturing processes.

With the contact-free fringe projection method of the MarSurf FP 40/180, complex 3D geometries with a high measuring point density can be quickly and comprehensively measured and evaluated.

### Measuring run

For the measurement, the corresponding sensor head is selected according to the measured object.

- Measuring head 40 for measuring field diameter 40 mm
- Measuring head 180 for measuring field diameter 180 mm.

The measurement procedure is defined in a measurement plan.

In the measurement plan, the sensor positions (number of views) and the sensor settings (mirror tilts) are stored.  
For fully automatic measuring sequences, the sensor is moved 360° around the measuring object. The measurement points are recorded at the positions defined in the measurement plan.

The data is saved in ASCII format.



### Accessories

#### Evaluation software

With Geomagic Qualify®, the created 3D point cloud can be compared with a CAD model and further evaluated and analyzed. Shape deviations between the measured values determined and the 3D CAD model are output as a color-coded height image. Further analysis options such as shape and position tolerances are integrated.

Traceable features such as the conversion of 3D scan data into accurate surfaces, polygon and native CAD models are available with the additional software package Geomagic Studio®.

### Technical Data

|                                            | MarSurf FP 40 / MarSurf FP 180 / Planar | MarSurf FP 40 / MarSurf FP 180 / Volume |
|--------------------------------------------|-----------------------------------------|-----------------------------------------|
| Area of use                                | 2.5D objects                            | Complex 3D objects                      |
| Measuring concept                          | Phasogrammetry<br>Fringe projection     | Multi-view fringe projection            |
| Measuring field                            | Ø 40 mm / Ø 180 mm                      | Ø 40 mm / Ø 180 mm                      |
| High measuring volume                      | 10 mm / 35 mm                           | 15 mm / 50 mm                           |
| Observation field                          | Ø 40 mm / Ø 180 mm                      | Ø 40 mm / Ø 180 mm                      |
| Measuring uncertainty                      | 2 µm / 5 µm                             | 5 µm / 25 µm                            |
| Measuring point distance                   | 45 µm to 50 µm / 150 µm to 200 µm       | 25 µm / 80 µm                           |
| Partial views                              | 1                                       | N: 1–24                                 |
| Measuring points per position (max.)       | 1.5 million                             | N x 1.5 million                         |
| Measuring time                             | 30 s to 200 s                           | N x (30 to 60)s                         |
| Detectable inclination angle on the object | Up to 40°                               | Under cuts up to 110°                   |