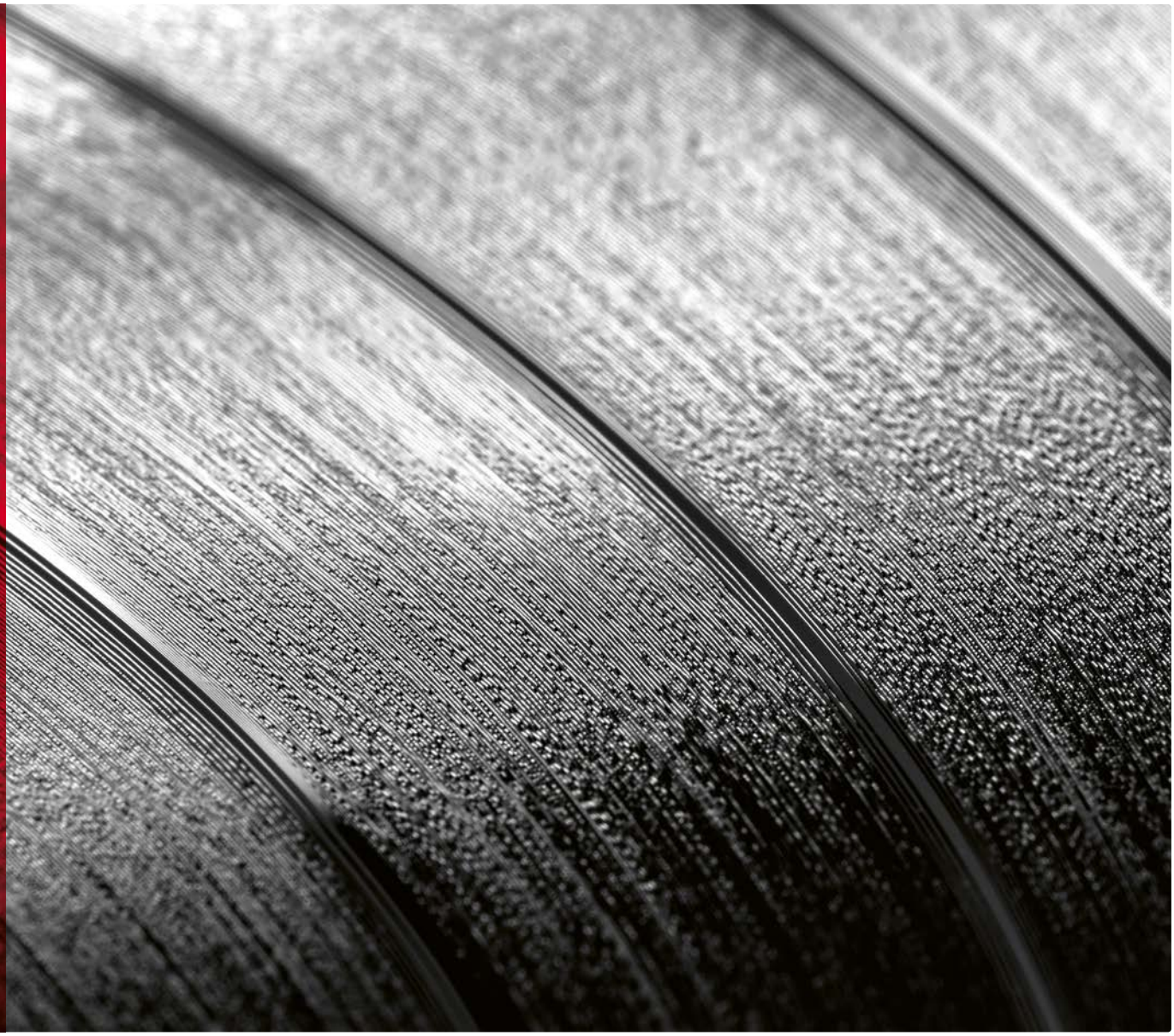
Portfolio for **mobile surface analysis**



MarSurf CM *mobile* | PS 10 | M 310 | M 400 | PocketSurf IV

Precisely determine roughness and waviness

Mahr's mobile measuring devices guarantee you precise measuring results with maximum mobility. The modern and easy way to measure using tactile and optical metrology.

Quality assurance simple and everywhere

In production things always have to move quickly: cycle rates are tight and throughput is planned far in advance. Mahr's mobile metrology allows you to measure the surface finish directly on site, and not just with large or heavy components. Our tools always provide you with reliable results, even when the measurements are complicated and you have to measure the components laterally or above your head.

Mahr's handy, compact mobile measuring instruments have all of the important functions of a stationary instrument, regardless of whether you are measuring the surface texture or you want to perform a static test of 2D parameters. Mahr's mobile surface metrology is easy to handle and allows you to preprogram so that you can get started on the workpiece immediately.

Advantages of Mahr mobile surface metrology:

- Location-independent
- Flexible
- Easy to handle
- Complex measurements
- Compact
- Pre-programmable
- Start on workpiece immediately

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Optical or tactile? Selecting the right measuring equipment

When should you rely on tactile metrology and when does it make more sense to measure using established optical devices? As both methods are equally precise, delivering results with 99 % accuracy, it always comes down to the surface structures you want to measure and which parameters are relevant for your production. Mahr offers you versatile solutions for both types of systems. The following criteria will help you make your selection:

1

Process values in accordance with ISO 4287, ISO 13565, ISO 25178 und ISO 21920

Tactile and optical devices identify the roughness and sometimes the waviness of surfaces – all the while in compliance with the standards DIN EN ISO 4287 and DIN EN ISO 13565. Optical devices also comply with the standard DIN EN ISO 25178 and in future with the standard DIN EN ISO 21920, which allow for an extensive description of a surface without contact.

Tactile	Optical
●	●
●	●
●	●
○	●

2

In no time with established process values

Roughness, waviness and primary profiles describe the surface and its properties. The parameters derived from that provide information about the quality of the surface. This guarantees reliability in the production process and makes it possible to carry out incoming goods checks quickly.

Tactile	Optical
●	●
●	●
●	●
●	●

3

Statistical testing

When it comes to machined surfaces, structures are often no longer arranged in a certain direction but are distributed at random. A 2D section does not sufficiently describe them or, if it does, it is extremely time consuming. However, the extensive optical sampling of the surface provides more information and fast measuring results.

Tactile	Optical
●	●
○	●
○	●
○	●

4

Measurement at the touch of a button

Simply place the probe arm on the surface, press the button and begin measurement – no need for complicated peripherals. Read the results directly on the display and print them out with the associated printer as desired. Enjoy all of this at an unbeatable price-performance ratio.

Tactile	Optical
●	○
●	○
●	○
●	○

5

Topological testing

When surfaces are extremely sensitive, soft, sticky or even discontinuous, non-contact and thus optical measurement is the method of choice. This applies equally to coated, inhomogeneous and complex surfaces as well as to surfaces without processing structures: It is best to scan and evaluate them optically.

Tactile	Optical
●	●
○	●
○	●
○	●

6

Easy accessibility

Both optical and tactile mobile devices enable reliable surface testing directly on the workpiece in the production area. To examine surfaces, small depressions or drill holes that are difficult to access, the removable drive units in tactile tools also present a particular advantage.

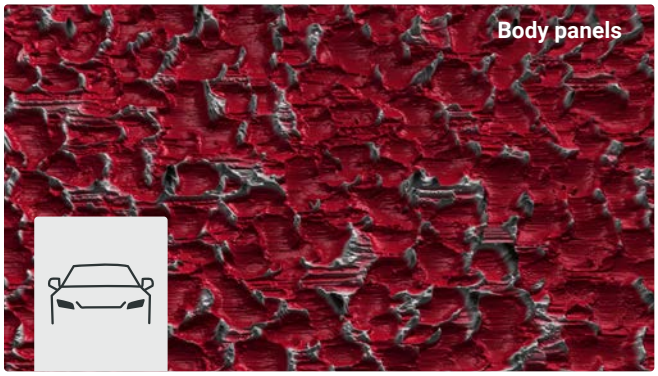
Tactile	Optical
●	●
●	●
●	○
●	○

Mahr | Optical 3D surface metrology

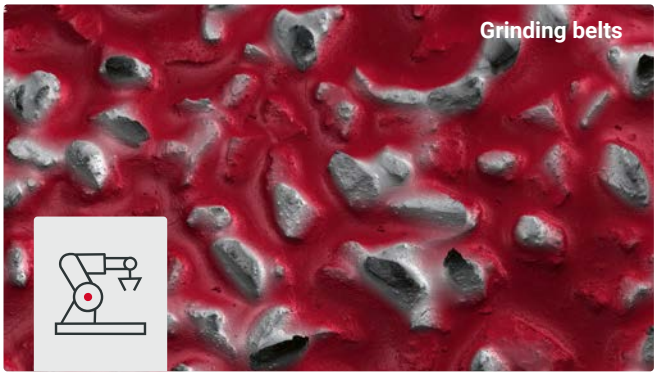
Contactless measurement of surfaces

Do you want an exact understanding of the surface structure and a profile section is simply not adequate? Do you need statistical information? If so, optical measuring methods are what you need: A 3D picture of a surface shows a number of properties not displayed by a single profile section. For this reason, this technology perfectly complements tactile metrology. You obtain additional information as well as a more detailed description of complex surfaces. You can also measure structures that cannot be measured using tactile metrology, such as coatings or sensitive surfaces.

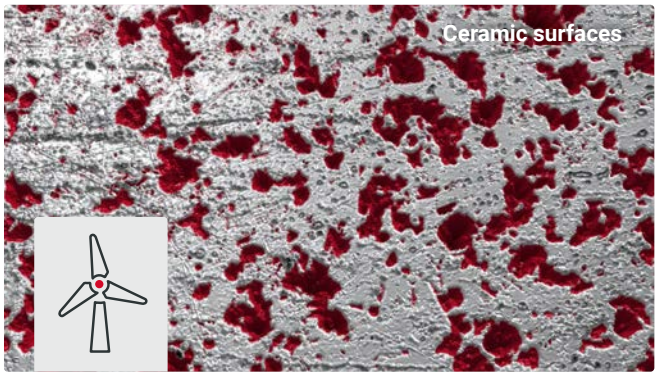
Sectors & applications



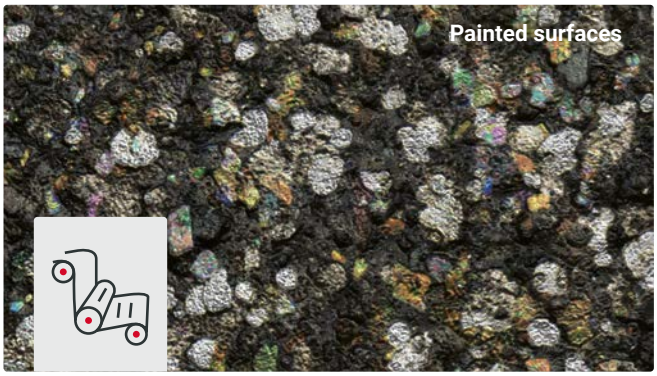
Automotive industry
Powertrains, car bodies, interiors, electronics and much more



Tool technology
Cutting and milling tools, micro tools, coatings and much more



Energy technology
Solar and fuel cells, batteries, gears and turbines



Printing industry & safety technology
Printing cylinder and plates, banknotes, chip cards and much more

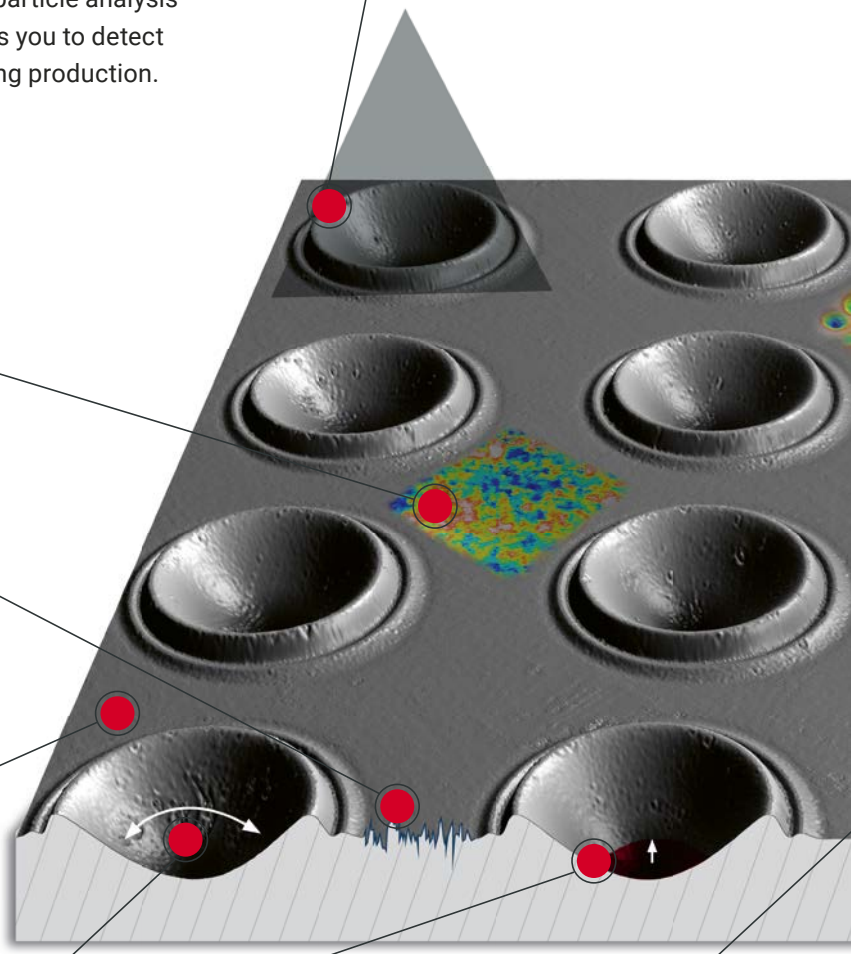
... as well as in other industries:
Medical technology, electronics & semiconductor technology, materials science and microsystems technology

Your surfaces
in focus

For each component to exhibit maximum performance, its surfaces must increasingly have special characteristics. That applies to shape deviations and roughness as well as waviness or geometric features. Only then do components qualify for further processing – otherwise they are discarded immediately. Mahr metrology provides you with the entire portfolio of characterization options based on precise measuring data. The topographical analyses range from particle analysis to angles, right down to layer thicknesses. This allows you to detect potential errors and take countermeasures even during production.

Visual inspection

Microscope image or photo-simulated image in the evaluations as well as 3D depictions



3D roughness (Sa, ...)

Extensive roughness evaluations as per ISO 25178

2D roughness (Rz, ...)

Profile roughness in accordance with ISO 4287, ISO 13565, ASME B46.1, ISO 12085, VDA, SEP or MBN standards

Profile trace errors (⌒)

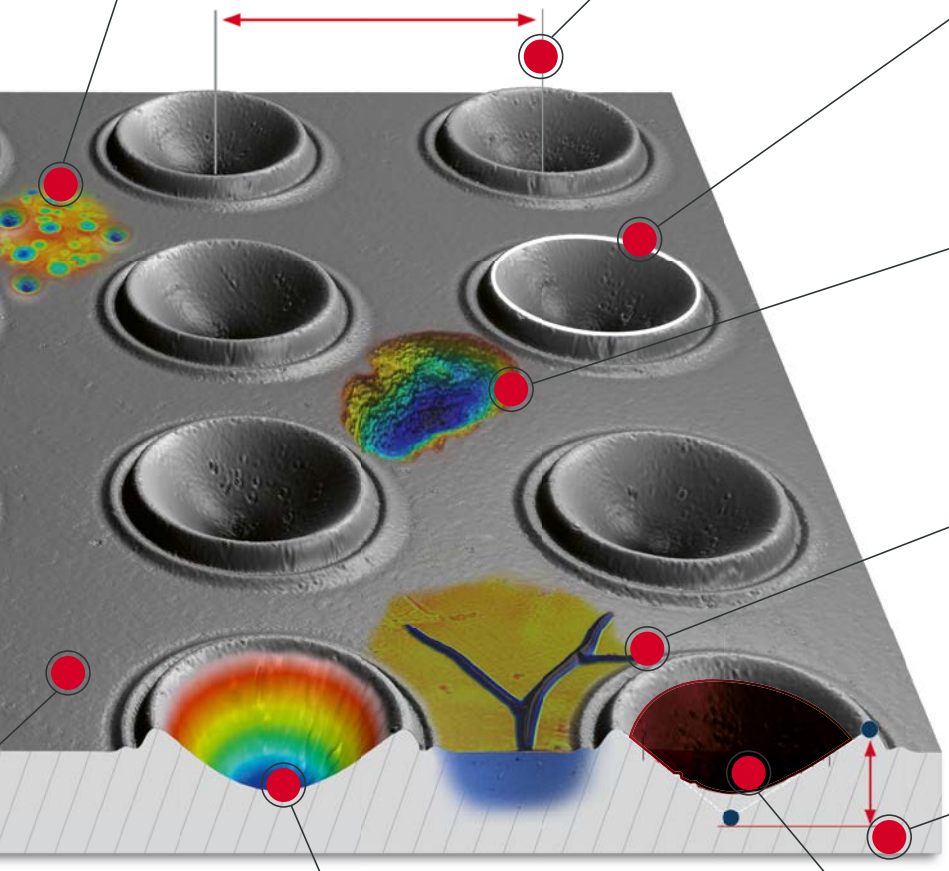
Linear errors compared to a target contour as well as straightness parameters as per ISO 12780

Contour analysis (∢,R)

Determining radii, circles, segments of a circle and angle determination including evaluation of half or full angles

Flatness (▱)

Determining the flatness of a full or partial surface, e.g. in accordance with ISO 12781



Particle analysis

Detection and classification of particles, grains, furrows, textures, hills and valleys

Distance measurements (Δ)

Comprehensive horizontal distance measurements (x;y), angle positions and inclinations

Form

Form deviation from planar contours, target/actual comparison with CAD data, roundness evaluation in accordance with ISO 12181

Error

Detection and analysis of defects, surface imperfections and damage

Layer thickness

Immediate determination of layer thickness in transparent surfaces, for opaque surfaces the layer thickness is determined via step height analysis

Height (Δz)

Distance measurements (z), determination of maximum and average heights as well as differences in position

Volume (V)

Volume calculations of hollows, hills, valleys, peaks and particles

Area (A)

Calculation of surface area in peaks and hollows as well as determination of maximum elevations/depressions

Mobile 3D surface measurement **for use anywhere**

Regardless of whether the surface is sensitive, very large or even shiny, the MarSurf CM mobile combines the unique properties of a portable and robust measuring system for production with the established functionality of a stationary system. The MarSurf CM *mobile* provides reliable and accurate measurements. Thanks to confocal 3D metrology, your measurements are quick, contactless and material-independent.

For measurements on large objects and specimens that are difficult to move, such as rollers and car bodies, the MarSurf CM *mobile* will impress you with its compact size, giving you the option to stitch larger measuring fields at a constantly high resolution thanks to the motorized axes. Featuring a lens revolver, the option of a color camera and application-specific software solutions, the measuring system fulfills the requirements of a wide range of measuring tasks and can be used wherever your work requires it.

Mobile and contactless

Regardless of workpiece dimensions and surface properties

HD stitching

High resolution, even with large measuring surfaces, due to motorized axes

Versatile

Roughness and microgeometrical measurements in one system

Get to know the entire MarSurf CM portfolio!

Do you require a stationary measuring station or want an automated solution? Visit our website!

Transport handle

Compact system for quick use

Robust

Reliable results, even in the production environment

Unique specifications

Roughness measurement in accordance with ISO 4287 and ISO 25178

1,200 x 1,200 px

Camera resolution

1.4 mio

Measuring points
per individual measurement

0.13 µm

Minimum measuring point level

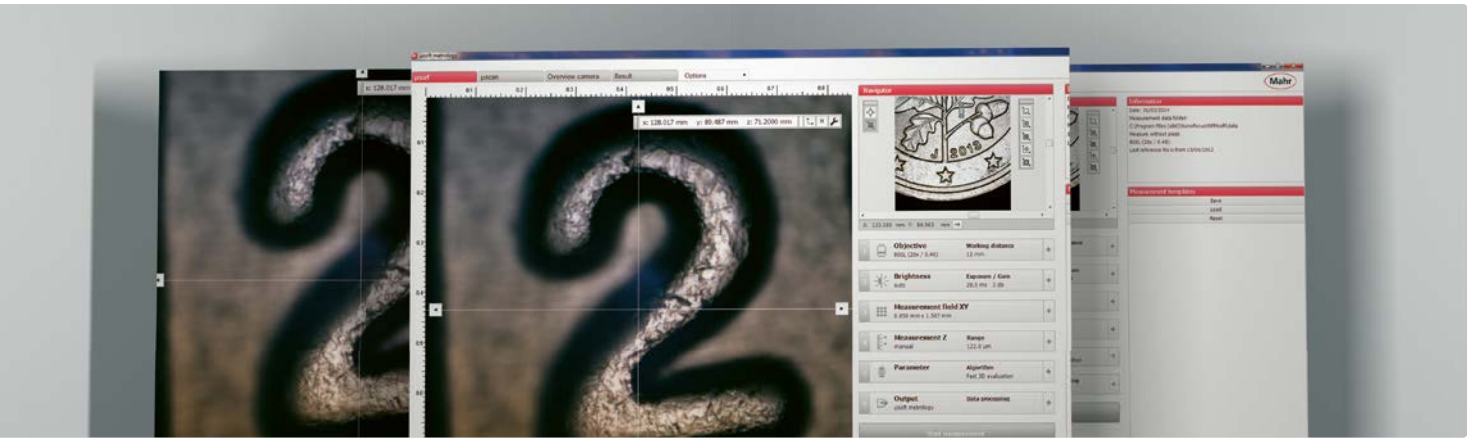
up to
100 fps
even at
maximum resolution

16 Bit

High dynamic range camera

Powerful measuring software
for any requirements

Controlling your measuring device is simple with the intuitive measurement and control software from MarSurf Metrology. Innovative snapshot technology delivers results quickly and effectively. After you have arrived at the desired sample position, simply click for optimum measuring results. The software then automatically regulates all settings, including the focus range and brightness. In addition, the surface analysis software MarSurf Mountains for Mahr offers a comprehensive function package in which characteristics can be easily analyzed and processed.



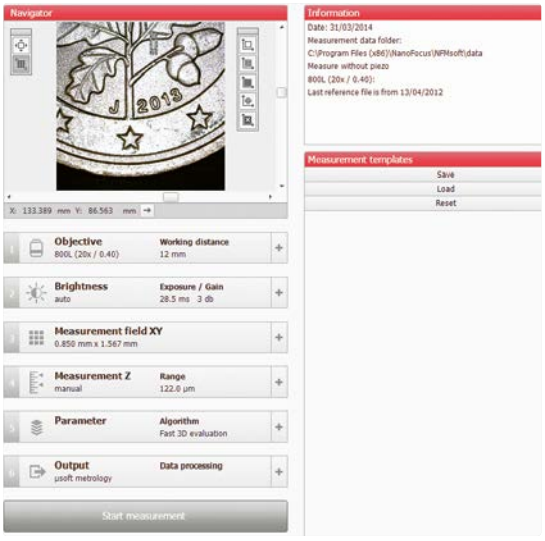
MarSurf Metrology Software (MSW)

The intuitive measurement and control software MarSurf MSW is an essential part of your measurements, guaranteeing you a smooth measuring routine.

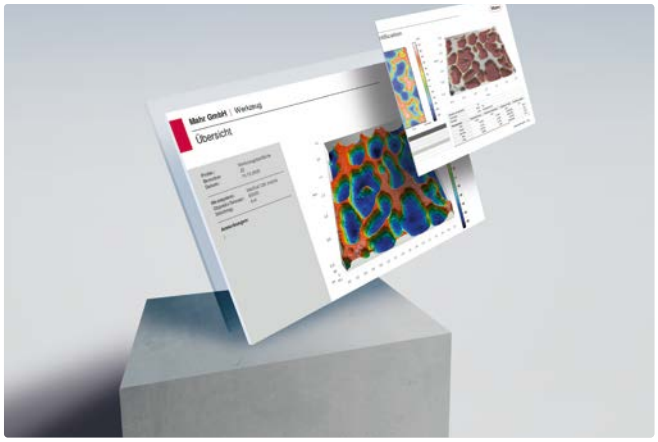
Navigator function: Create overview images and conveniently define the desired measuring range using the mouse.

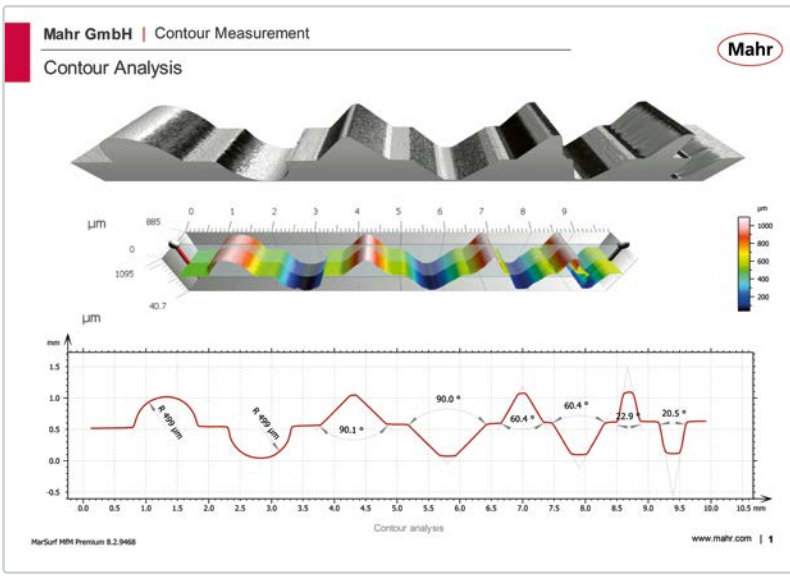
Template function: Save measuring parameters and positions as templates and easily complete semi-automated measuring series.

Snapshot technology: After you have arrived at the desired sample position, simply click for optimum measuring results. The MarSurf MSW automatically regulates all settings, including the focus range and brightness. At the same time there is enough space for individual settings.



Software packages	Capabilities
MarSurf MSW	Standard
MarSurf MfM	Optional
Export formats	FITS, NMS, OMS, X3P, ASCII, SDF, SUR, TIF, BMP, STL
Language packs MarSurf MSW	German, English, French, Italian, Spanish, Portuguese, Polish, Russian, Turkish, Japanese, Korean, Chinese





MarSurf Mountains for Mahr Software (MfM)

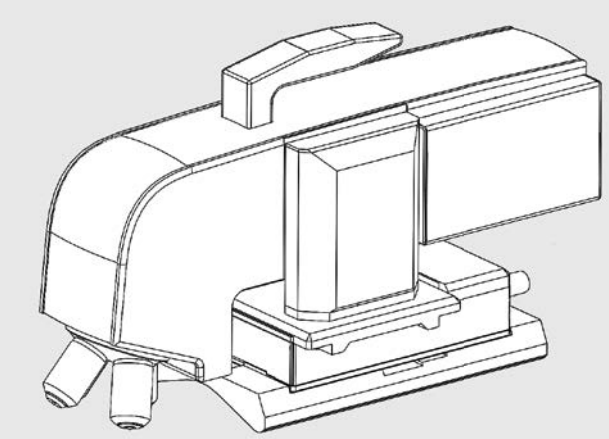
The surface analysis software MarSurf MfM offers a comprehensive function package, which is required to display and analyze structure, roughness, waviness, step height, contours and other surface characteristics. The intuitive multilingual user interface makes it possible to create complex analytical reports at the touch of a button. Editing and evaluating measuring data is simple. A variety of display options such as profile view, 3D reconstruction and detailed microscopic images create informative measuring protocols. It is easy for users to create and implement individual evaluation formulas.

The software always contains the most up-to-date standard parameters and filter functions and is available in the standard, extended and premium versions. Special modules for statistical evaluation or particle analysis, for example, are also available.

Effective evaluation and documentation

- Evaluation at the touch of a button
- Informative measuring reports
- Customer-specific adaptation and evaluation
- 3D analysis, ISO 25178, ISO 13565, ISO 12781
- 2D analysis, ISO 4287
- Geometry, volume, contour, CAD comparison

MarSurf CM *mobile*



417 × 136 × 234 mm³

General information	
Measuring principle	Patented CMP technology (Confocal Multi Pinhole)
Light source	High-performance LED (505/475 nm), MTBF: 50,000 hours (color camera with high-performance white light LED)
Typical measuring time	2 – 8 s
Electrical power	Voltage: 100-240 V; Frequency: 50-60 Hz, Power consumption: <50 W
Type of computer	Industrial PC / laptop
Cable length	Measuring instrument: 6 m

Configuration	
Tripod form	Mobile
Mass	8.3 kg
Positioning volume	50 × 50 × 35 mm³
Path length meas. system x,y	Standard
System controller	Integrated
Active / passive vibration dampening	Optional

Sample properties	
Sample height (mm)	Flexible
Sample weight max. (kg)	Flexible
Sample surface	Reflectivity: 0.1 – 100 %, coated, uncoated, reflective to diffuse

Measuring head		
Image acquisition module	Max. number of measuring points in a single meas. x * y	1200 x 1200 = 1.44 m.
	Max. image data at full resolution (Hz)[1]	25/100
	HDR function (16 Bit)	Standard
	Color photo	Optional
Maximum number of meas. points[2]		1213 million
Measuring module vertical	Vertical adjustment range (motorized)	35 mm
	Fine adjuster (Piezoelectric module, vertical adjustment range)	350 µm
Lens holder	4x revolver	Standard
	No revolver	Optional

S: normal working distance, XS: short working distance

Lens[3]	3200S	1600S	800S	800XS	320S	160S
Lens magnification	5x	10x	20x	20x	50x	100x
Lateral measuring range x,y	3200 µm	1600 µm	800 µm	800 µm	320 µm	160 µm
Lateral measuring range x × y	10.24 mm^2	2.56 mm^2	0.64 mm^2	0.64 mm^2	0.1024 mm^2	0.0256 mm^2
Extended lateral measuring range (stitching without data reduction)						
x,y	50 mm	46.4 mm	23.2 mm	23.2 mm	9.2 mm	4.6 mm
x × y	2500 mm^2	2152 mm^2	538 mm^2	538 mm^2	84,6 mm^2	21,1 mm^2
Numerical aperture NA	0.15	0.3	0.45	0.6	0.8	0.9
Working distance	20 mm	11 mm	3,1 mm	1 mm	1 mm	1 mm
Computational critical angle[4]	8.6 °	17.5 °	26.7 °	36.9 °	53.1 °	64.2 °
Vertical measuring range						
with motorized adjuster unit	19.9 mm	10.9 mm	3 mm	0.9 mm	0.9 mm	0.9 mm
with fine adjuster	–	0.35 mm	0.35 mm	0.35 mm	0.35 mm	0.35 mm
Measuring noises						
with motorized adjuster unit	354 nm	71 nm	25 nm	14 nm	14 nm	14 nm
with fine adjuster	–	14 nm	4 nm	3 nm	1 nm	1 nm
Vertical resolution						
with motorized adjuster unit	1000 nm	200 nm	70 nm	40 nm	40 nm	40 nm
with fine adjuster	–	40 nm	10 nm	8 nm	4 nm	2 nm
Sampling rate 1200 × 1200 px	2.67 µm	1.33 µm	0.67 µm	0.67 µm	0.27 µm	0.13 µm
Computational lateral optical critical resolution[5]	1.93 µm	0.96 µm	0.64 µm	0.48 µm	0.36 µm	0.32 µm

Accuracy[6,7]		Normal	Uncertainty
Measurement uncertainty based on the example of roughness measurement[8, 9, 10, 11]	with lens 800XS	Ra = 1.63 µm	U = 0.040 µm, σ = 0.004 µm
		Ra = 0.58 µm	U = 0.024 µm, σ = 0.0066 µm
		Ra = 0.23 µm	U = 0.010 µm, σ = 0.0050 µm
	with lens 320S	Ra = 0.079 µm	U = 0.010 µm, σ = 0.0022 µm

1. On request.
2. Maximum number of measuring points that can be recorded in a composite measurement.
3. Additional lenses available on request.
4. Theoretical critical angles on reflective surfaces, on real surfaces can achieve larger critical angles due to diffuse reflections.
5. Based on the example of a 475 nm light source, calculated according to the Rayleigh criterion
6. VIM 2012
7. With fine adjuster
8. U as per ISO/IEC GUIDE 98-3:2008(E), GUM:1995, K=1.96 (level of confidence 95%)
9. σ determined for 25 measurements
10. Measured under the best possible conditions using PTB-certified standards. Results valid for standards used only
11. Evaluation according to ISO 4287

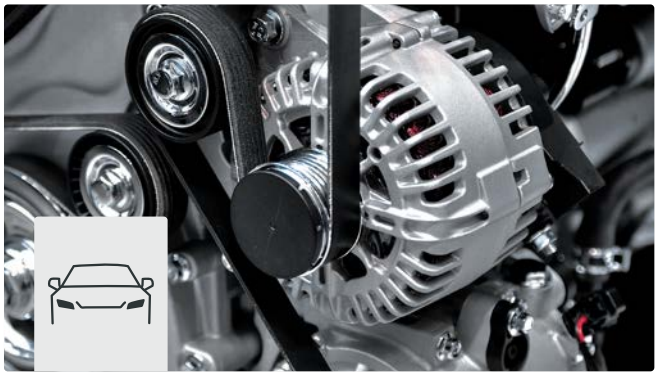
Mahr | Tactile 2D surface metrology

Tactile measuring instruments for quality control

Tactile metrology is the standard measuring procedure used to determine the roughness and waviness of surfaces. It has been an essential part of quality assurance since the 1930s. It is based on precise sampling using a stylus tip whereby a 2D profile of the surface is created and then recorded point by point.

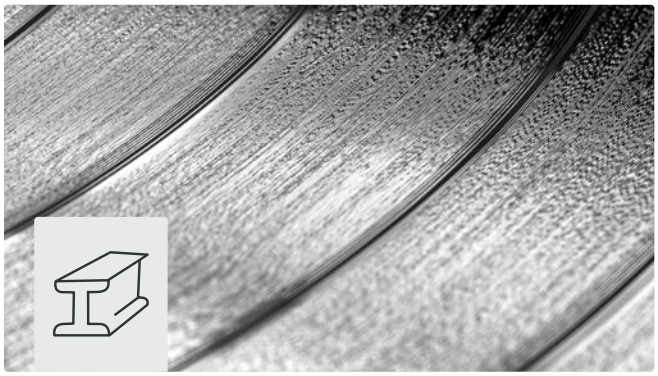
Probing systems are extremely accurate: Results and measured values provide data in the range of micrometers and allow for very detailed conclusions to be drawn as to the quality of the processing of the workpiece analyzed. On top of that, Mahr mobile tactile devices are extremely handy, reliable and cover all of the common parameters of the most important standards.

Sectors & applications



Automotive industry
Steering, brake system, gearbox, crankshaft, camshaft, cylinder head, cylinder block, turbocharger

Machine
Bearings, shafts, racks, valves



Steel industry
Sheet and roller surfaces

Medical technology
Surface roughness measurement for hip and knee endoprosthesis

Aerospace
Turbines and wings

Point for point, Line for line

This overview illustrates which of the Mahr measuring instruments best fits your individual measuring tasks.

	MarSurf PS 10 Page 20	**MarSurf M 310** Page 24
Probe system	Skidded probe system	
Parameter	Ra, Rq, Rz, Ry (JIS), Rz (JIS), Rmax, Rp, Rp (ASME), Rpm (ASME), Rv, R3z, Rk, Rpk, Rvk, Mr1, Mr2, A1, A2, Vo, Rt, RPc, Rmr, tp (JIS, ASME) equivalent to Rmr, RSm, Rsk, S, CR, CF, CL, R, AR, Rx	Ra, Rq, Rz, Ry (JIS), Rz (JIS), Rmax, Rp, Rp (ASME), Rpm (ASME), Rv, R3z, Rk, Rpk, Rvk, Mr1, Mr2, A1, A2, Vo, Rt, RPc, Rmr, tp (JIS, ASME) equivalent to Rmr, RSm, Rsk, S, CR, CF, CL, R, AR, Rx
Standards	x	x
Measuring range	350 µm	350 µm
Traversing length	17.5 mm	17.5 mm
Auto-cutoff	x	x
Memory	PDF protocol 1500, 10,000 results (can be extended with 32 GB SD card)	
Measuring programs	–	x
Remote control / ASCII Commands	–	x
Tolerance	x	x
Printer	–	x (via USB-A)
Scanner or keyboard	–	x (über USB-A)
Ports	MarConnect, Micro-USB, microSD	USB-A for scanners, printers or Bluetooth dongle, MarConnect, Micro USB and microSD card
Data transfer	Cables	Cables or Bluetooth

MarSurf M 400 Page 30	**MarSurf PocketSurf** Page 34
Skidless probe system	Skidded probe system
Ra, Rq, Rz, (equivalent to ISO), Ry (JIS) equivalent to Rz, Rz (JIS), Rmax, Rp, Rp (ASME), Rpm (ASME), Rv, Rpk, Rk, Rvk, Mr1, Mr2, A1, A2, Vo, Rt, R3z, RPc, HSC, Rmr, tp (JIS, ASME) equivalent to Rmr, RSm, RS, Rdq, Rsk, Rku, Rdc, Htp, Pdc, Pa, Pt, Pmr, Ptp, Wa, Wq, WSm, Wsk, Wt, R, AR, AW, Rx, Wx, Wte, W, NR, NCRX, NW, CPM, CR, CF, CL	Ra - 6.35 µm / 250 Ry, Rmax, Rz - 25.3 µm / 999 µin
x	–
500 µm (up to 1500 µm with three times the probe arm length)	Ra - 6.35 µm / 250 Ry, Rmax, Rz - 25.3 µm / 999 µin
26 mm	15 mm
x	–
40,0000 Ergebnisse	–
x	–
–	–
x	–
x (integrated)	–
–	–
MarConnect, Micro-USB	MarConnect, cables
Cables	Cables

Mobile measuring
made easy

The MarSurf PS 10 is the ideal entry level instrument for surface metrology: Its extraordinarily simple and intuitive operation, along with numerous safety functions including the automatic cutoff, make the device as easy to control as a cellphone. Due to its minimal size, it is also perfect for location-independent measurements – vertical, horizontal and even overhead if necessary. And thanks to the removable drive unit, the MarSurf PS 10 can be used flexibly in production.

The measuring instrument boasts three order options for increased flexibility: with stylus tip 2 µm, 5 µm and also a variant with a transverse drive unit (MarSurf PS 10 C2).

500 g
lightweight

- Intuitive operation: As easy as using a smartphone with a rotatable display
- Creates complete PDF measuring records right in the measuring instrument and data backup as TXT, X3P, CSV and PDF files
- Customized comments for the PDF measuring record entered directly into the MarSurf PS 10
- Error-free operation thanks to an integrated, removable roughness standard
- Automatic cutoff selection, ensuring that even non-specialists get the correct measuring results

9
other optional
probes

Always at hand

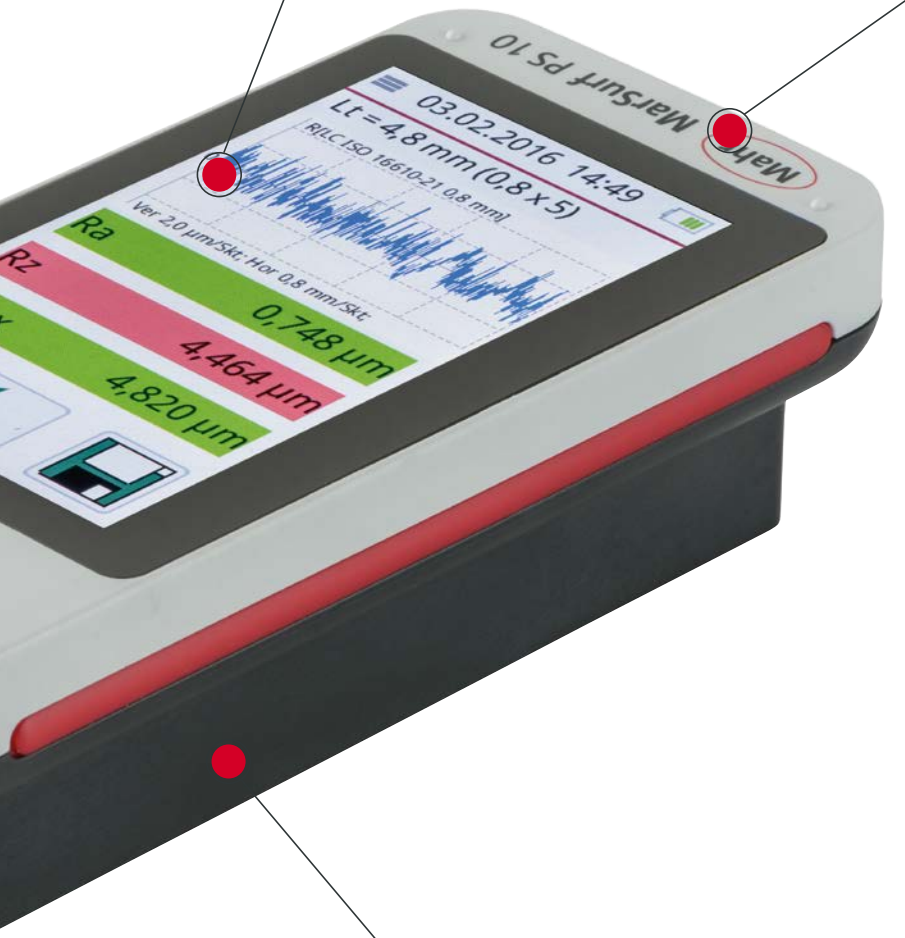
The calibration standard stays in the instrument and can be checked at any time.

Extremely easy to operate with detailed profile display

The large 4.3” high-resolution and backlit TFT touch display allows intuitive operation and precise representation of the measuring profile.

Perfect evaluation and documentation

Measuring records are automatically created in the instrument without the need for additional software.



up to

500,000

measurements
can be stored in the instrument

31

Parameters
Same range of functions as a laboratory instrument

4.3”

TFT Touch Display
similar to a smartphone

at least

1,200

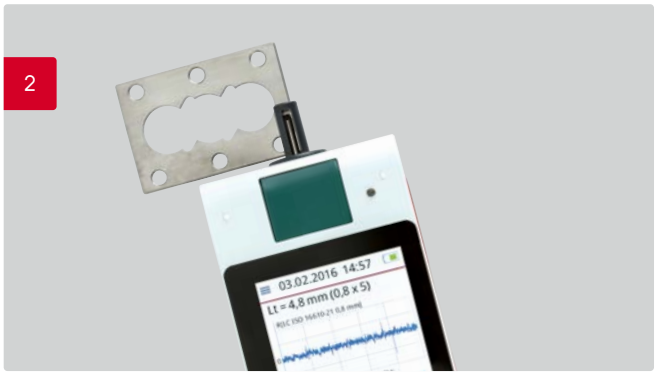
measurements
without power supply

Flexible use

The removable drive unit, in conjunction with the optional handheld support, lends this instrument added versatility where space is limited, e.g. in holes or when measuring small parts.

Important **additional functions**

1. Roughness measurement on shafts



2. Roughness measurement on flat surfaces

3. Roughness measurement with measuring stand ST-D

4. Removable drive unit for measurement in small bores

Scope of delivery

- MarSurf PS 10 basic unit
- Drive unit (detachable)
- 1 standard probe conforming to standards
- Built-in rechargeable battery
- Roughness standard integrated into housing (detachable), including Mahr calibration certificate
- Probe protection / V-block holder
- Charger / 3 adapters
- Operating instructions
- Carry case with shoulder strap
- USB cable
- Extension cable for drive unit (length 1.2 m)
- Height adjustment (integrated)
- Handheld support (only with item no. 6910235)

Device information

MarSurf PS 10

Item no. 6910230 (2 µm stylus tip) | Item no. 6910232 (5 µm stylus tip) | Item no. 6910235 (C2 for transverse tracing)

Measuring principle	Stylus method
Probes	Inductive skidded probe
Parameters	Ra, Rq, Rz, Ry (JIS), Rz (JIS), Rmax, Rp, Rp (ASME), Rpm (ASME), Rv, R3z, Rk, Rpk, Rvk, Mr1, Mr2, A1, A2, Vo, Rt, RPc, Rmr, tp (JIS, ASME) equivalent to Rmr, RSm, Rsk, S, CR, CF, CL, R, AR, Rx
Unit of measurement	metric/inches
Measuring range	0.350 mm
Profile resolution	8 nm
Filter as per ISO/JIS	Gaussian filter as per ISO 16610-21 (formerly ISO 11562), special filter as per DIN EN ISO 13565-1, Ls filter as per DIN EN ISO 3274 (can be switched off)
Cutoff lc as per ISO/JIS	0.25 mm, 0.8 mm, 2.5 mm, automatic filter detection
Traversing length Lt as per ISO/JIS	1.5 mm, 4.8 mm, 15 mm, N x Lc, variable, automatic
Traversing length as per ISO 12085 (MOTIF)	1 mm, 2 mm, 4 mm, 8 mm, 12 mm, 16 mm
Total length ln as per ISO/JIS	1.25 mm, 4.0 mm, 12.5 mm
Number n of sampling lengths as per ISO/JIS	Selectable: 1 to 16
Stylus tip	2 µm (Item no. 6910230)
	5 µm (Item no. 6910232)
Measuring force (N)	0.00075
Calibration function	Dynamic; Ra, Rz, Rsm
Memory	Max. 3900 profiles, max. 500,000 results, max. 1,500 PDF measuring records, expandable to 32 GB with microSD card (320x memory capacity)
Languages	German, English, French, Italian, Spanish, Portuguese, Dutch, Swedish, Russian, Polish, Czech, Japanese, Chinese, Korean, Hungarian, Turkish, Romanian
Miscellaneous	Lock/password protected, date/time
Data interface	USB, MarConnect (RS-232), microSD slot for SD / SDHC cards up to 32 GB
Protection rating	IP 40
Battery	Lithium-ion battery, 3.7 V, at least 1200 measurements
Long-range AC adapter	100 to 264 V
Dimensions	160 x 77 x 50 mm

Brings added value for **mobile roughness measurement**

Are you used to using your smartphone to access your data anytime, wherever you are? That is exactly what Mahr's MarSurf M 310 provides you with: A flexible all-rounder for the mobile recording and evaluation of measuring data. Simple operation and a robust design make this Mahr product perfectly suited for use in production, where dirt and dust can clog the instrument and it is often users with little prior knowledge performing the quality control.

For all those who need more

The **MarSurf M 310** has the same functions as the PS 10 but has even more crucial added benefits for you:

1. **Print directly, document easily**
   Measuring results in paper form? Sometimes still the fastest way! The mobile printer allows you to save data on thermal paper, which can then be added directly to the workpiece.

2. **Preprogrammed measuring functions for immediate measuring success**
   A variety of measuring parameters can be defined, saved and then called up on the workpiece in the device settings. Additionally, it works using a barcode scanner, which simply connects to the MarSurf M 310. This allows even workers without expert knowledge or training to determine reliable roughness parameters.

3. **Robot ready: Integrate instrument directly in the production line**
   The MarSurf M 310 and its interfaces can be directly integrated into your production lines, such as for measuring tasks on the robot arm. They control the measuring instrument remotely – conveniently from your computer, for example.

Status at a glance

Instrument status at a glance thanks to two easily visible status LEDs. Depending on the signal color, a measurement is underway, data is being transferred or an error has been detected. Standby mode shows the charging status.

Robust in every respect

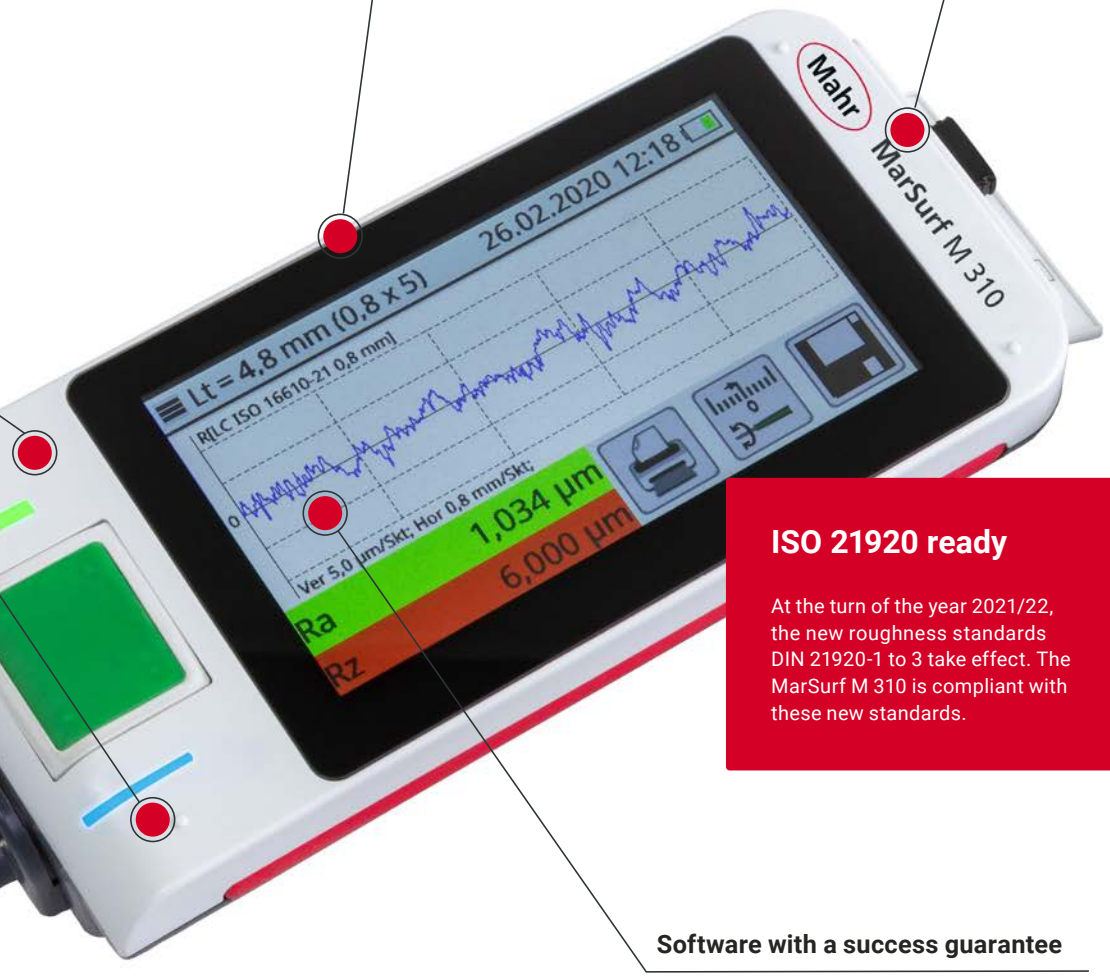
Equipped for virtually any environment: The robust skidded probe system means that the measuring instrument is less sensitive to vibrations. The PHT probe is easy to clean due to its open skid.

Modern optics, perfect display

A high resolution, backlit 4.3” TFT display ensures precise display of your measuring results. It is operated directly via the touchscreen – just as you are used to with your smartphone.

IATF compliant

The MarConnect duplex interface enables the transmission of a measuring equipment ID with each measurement. This makes measuring results traceable at any time.



ISO 21920 ready

At the turn of the year 2021/22, the new roughness standards DIN 21920-1 to 3 take effect. The MarSurf M 310 is compliant with these new standards.

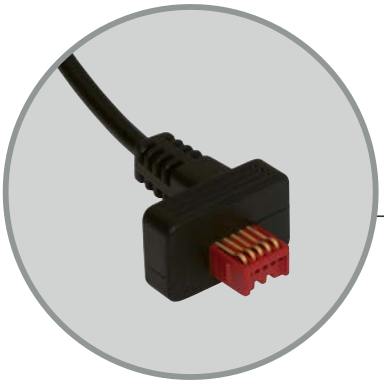
Software with a success guarantee

With this measuring instrument, you can reliably determine roughness parameters even without expert knowledge or training – thanks to intuitive software, clear menu structures and preprogrammed measuring functions.

Best connections
for secure data

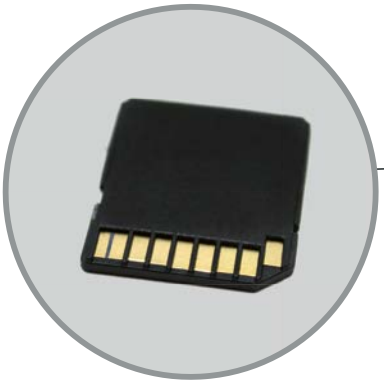
To save your measuring data, the MarSurf M 310 has a variety of interfaces available: Data transfer is possible wirelessly via Bluetooth, wired via USB, Micro USB or the proven MarConnect duplex interface. The latter also transmits a measuring equipment ID, ensuring that your measuring results are traceable.

Simply choose between complete measuring records in PDF format, individual measuring values or a CSV file for measuring records.



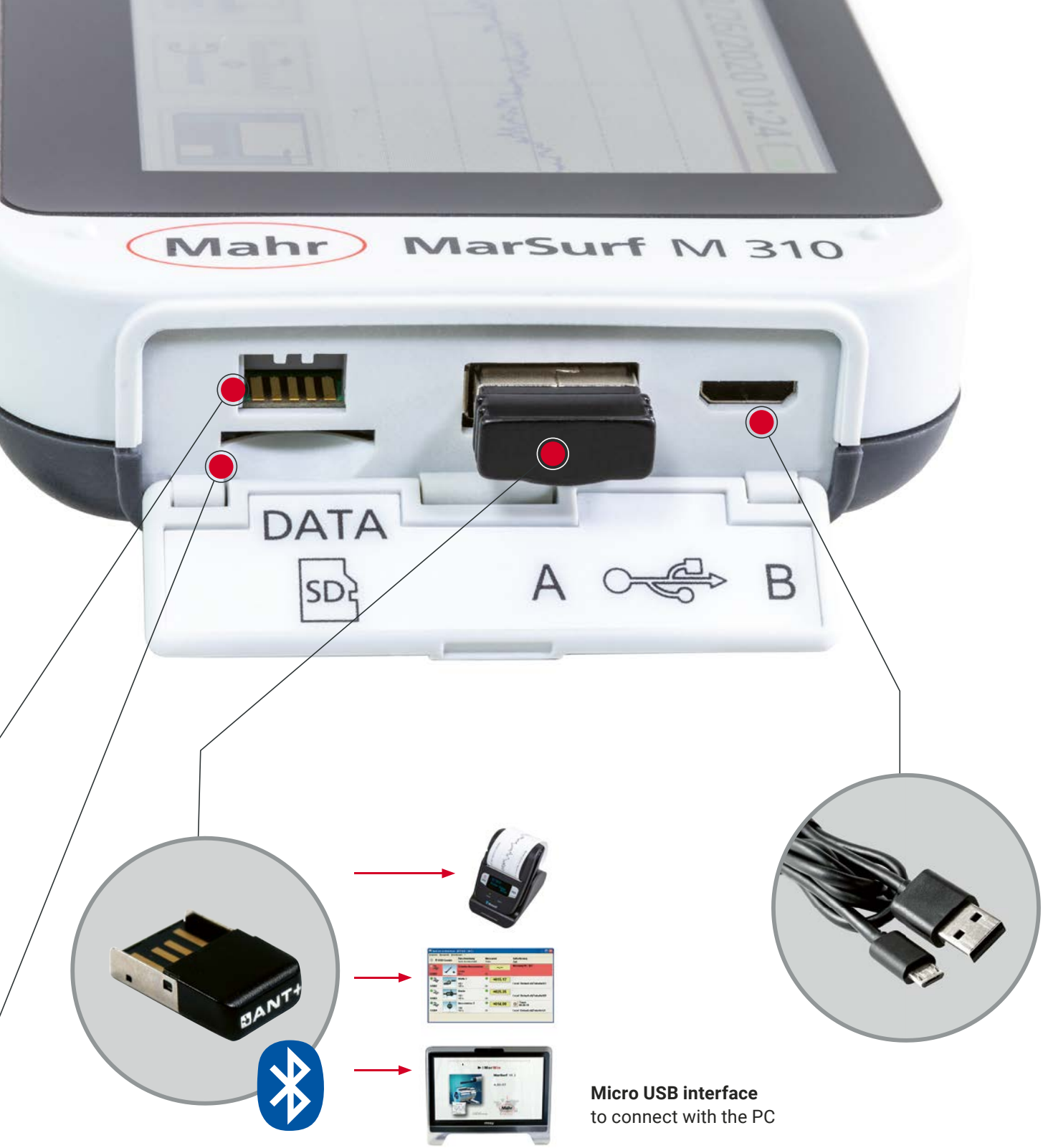
MarConnect duplex interface
for the MarCom Professional data transmission software

Equipped with the proven MarConnect duplex interface, the MarSurf M 310 makes it possible to transmit a measuring equipment ID with each measurement. This makes it possible to reliably record which measuring instrument performed a certain check in order to guarantee the traceability of your measuring results.



SD slot
for a microSD or microSDHC card up to 32 GB, to which the profiles, profiles with results, results and/or measuring records can be saved.

If necessary, a software update can be carried out using a microSD card.



USB-A interface
for the connection of, for example, a USB Bluetooth adapter, USB/Bluetooth printer, barcode scanner or a keyboard

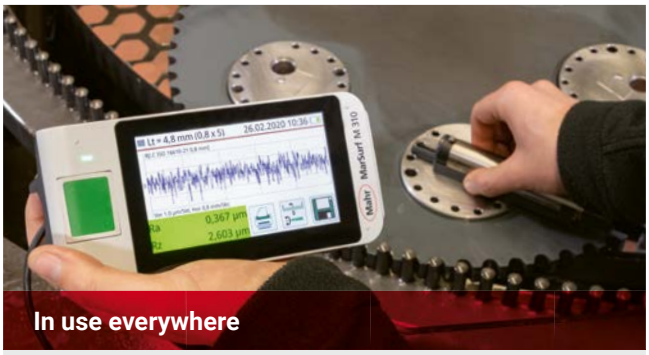
- Printing results and profiles
- Wireless data transmission via Bluetooth to MarCom software to save the results, e.g. in Excel or a virtual interface box
- Use the M 310 as drive unit with the MarWin Easy Roughness
- software, the M 310 is directly controlled by the software

Micro USB interface
to connect with the PC

The MarSurf M 310 can be integrated into the production process via the Micro USB interface and can be controlled remotely via ASCII commands – using software for statistical process control. A computer monitors measuring series over longer periods of time or statistically evaluates them according to superordinate aspects.

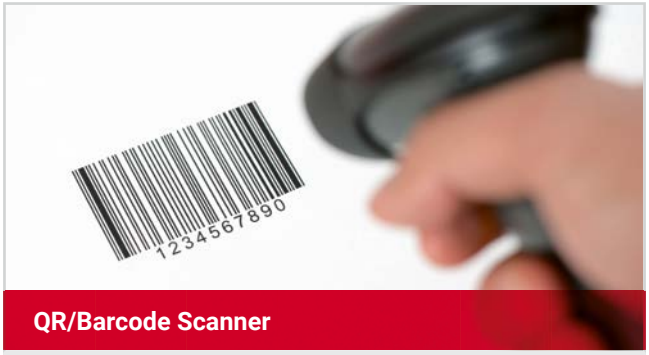
- Starts a measurement with the current measuring conditions
- Calculates the thread parameters selected on the MarSurf M 310 with the evaluation conditions
- Transfers all calculated parameter results in one string that is completed with <CR>

Flexible all-rounder
for your quality assurance



In use everywhere

Due to its compact design, the MarSurf M 310 is the perfect companion for mobile measuring tasks. Whether horizontal, vertical or overhead, you benefit from the simple, network-independent handling. The removable drive unit allows you to take flexible measurements with the MarSurf M 310, even in the tightest spaces. Its large, bright, 4.3" display offers easy operation and a maximum overview while its operating concept enables intuitive handling without training. Despite its compact size, the M 310 boasts 31 parameters, offering the same range of functions as a laboratory instrument.



QR/Barcode Scanner

The QR/Barcode scanner makes it possible to connect to a commercially available hand scanner via USB or Bluetooth. In other words: simply scan data or codes instead of entering them manually.

Options:

- Scan a QR/barcode on the workpiece to start the assigned program
- Scan a QR/barcode on the workpiece to input workpiece information (drawing no. etc.) into profile information

Handheld **support**

The associated handheld support provides real added value for your work: The proven accessory considerably expands the field of application. The handheld support makes it possible to flexibly position the probe without a costly measuring tripod.

Simple overhead measurement of small parts

Measurements of end faces of workpieces

Device information

MarSurf M 310

Item no. 6910260 (2 µm stylus tip) | Item no. 6910265 (5 µm stylus tip) | Item no. 6910264 (C2 for transverse tracing)

Measuring principle	Stylus method
Probes	Inductive skidded probe
Parameters	Ra, Rq, Rz, Ry (JIS), Rz (JIS), Rmax, Rp, Rp (ASME), Rpm (ASME), Rv, R3z, Rk, Rpk, Rvk, Mr1, Mr2, A1, A2, Vo, Rt, RPc, Rmr, tp (JIS, ASME) equivalent to Rmr, RSm, Rsk, S, CR, CF, CL, R, AR, Rx
Unit of measurement	metric/inches
Measuring range	0.350 mm
Profile resolution	8 nm
Filter as per ISO/JIS	Gaussian filter as per ISO 16610-21 (formerly ISO 11562), special filter as per DIN EN ISO 13565-1, Ls filter as per DIN EN ISO 3274 (can be switched off)
Cutoff lc as per ISO/JIS	0.25 mm, 0.8 mm, 2.5 mm, automatic filter detection, variable
Shorter cutoff as per ISO/JIS	selectable
Traversing length Lt as per ISO/JIS	1.5 mm, 4.8 mm, 15 mm, N x Lc, variable, automatic
Traversing length as per ISO 12085 (MOTIF)	1 mm, 2 mm, 4 mm, 8 mm, 12 mm, 16 mm
Total length ln as per ISO/JIS	1.25 mm, 4.0 mm, 12.5 mm
Number n of sampling lengths as per ISO/JIS	Selectable: 1 to 16
Stylus tip	2 µm (Item no. 6910260), 2 µm with printer (Item no. 6910267)
	5 µm (Item no. 6910265), 5 µm with printer (Item no. 6910268)
Measuring force (N)	0.00075
Calibration function	Dynamic; Ra, Rz, Rsm
Memory	Min. 3900 profiles, min. 500,000 results, min. 1500 PDF measuring records, expandable to 32 GB with microSD card (320x memory capacity)
Languages	German, English, French, Italian, Spanish, Portuguese, Dutch, Swedish, Russian, Polish, Czech, Japanese, Chinese, Korean, Hungarian, Turkish, Romanian
Miscellaneous	Lock/password protected, date/time
Data interface	USB A, USB B, MarConnect (bidirectional), microSD slot for SD / SDHC cards up to 32 GB
Protection rating	IP 40
Battery	Lithium-ion battery, 3.7 V, at least 1200 measurements
Long-range AC adapter	100 to 264 V
Dimensions	160 x 77 x 50 mm

Twin pack with unlimited possibilities

Together with the BFW 250 probe system, the MarSurf M 400 evaluation instrument makes up an unbeatable twin pack: In addition to roughness profiles, highly accurate, standard waviness measurements can be carried out – location-independent in production or in measuring rooms. The reason for this is the integrated skidless probe system that allows a special depth depending on the probe arm – up to 30 mm in grooves, for example. In addition, the handy tool can also be quickly combined with a number of probe arms without the use of tools thanks to the magnetic probe arm holder. The large selection also ensures that the broad measuring range is tripled from 500 µm to up to 1,500 µm.

Always keep track

Thanks to the vibrant color display and simple user guidance, you can allocate your results anytime.

On-site documentation

Use the integrated thermal printer for profiles and results to print out your evaluations on site.

Flexible & mobile handling

Select the system that works for you: either wireless with Bluetooth connection or the wired version. Whatever you decide, you can always choose between plugging in to a power supply or using the battery, which means you never lose mobility.

Reliable metrology, reliable results

The highly precise probe system ensures that any skidless tracing as per ISO, JIS or ASME works. Complies with standard measuring point density at all times.

Short setup time, quick change

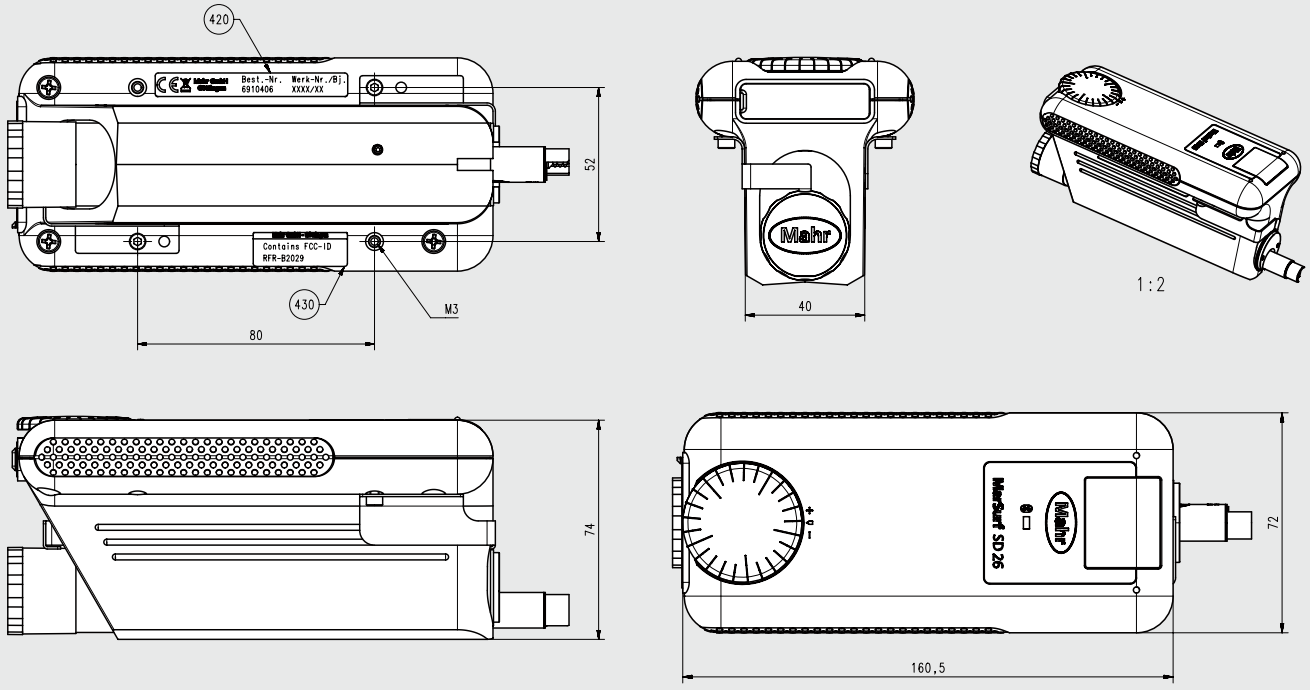
Due to the motorized height adjustment of the drive unit with automatic zero setting, all you need is a few seconds for setup. It is equally fast to change the probe arm thanks to the magnetic holder.

Scope of delivery (both sets):

- MarSurf M 400 evaluation instrument
- MarSurf SD 26 drive unit including BFW 250 probe system
- Standard probe arm (6852403)
- Thermal paper
- Wide-range power supply unit with 3 adapters
- 2 x USB cables (for connecting to the PC and for use with cable)
- Operating instructions
- Delivery in easy-to-handle transport case

MarSurf M 400 Set | M 400 C Set

Item no. 6910404 | Item no. 6910412



Drive unit SD 26	Values
Measuring path	26 mm
Measuring speed	0.2 mm/s; 1 mm/s
Positioning speed in X	5 mm/s
Height adjustment Z	7.5 mm, motorized
Positioning speed in Z	2 mm/s
Zeroing the probe system	Automatic to zero or target value in probe measuring range
Inclination adjustment	±1.5 ° (alignment function with user guidance in the evaluation instrument)
Temperature (storage)	-15 °C bis +55 °C
Temperature (operation)	+5 °C bis +40 °C
Rel. humidity	30 % to 85 %, non-condensing
Weight	M 400: approx. 1.0 kg; SD 26: approx. 0.9 kg
Ports	USB Slave, MarConnect (RS232)
Long-range AC adapter	90 V to 264 V

MarSurf M 400 Set	
Profile determination	Primary, waviness and roughness profile
Probes	Inductive skidless probe system with changeable probe arms, 2 µm stylus tip, measuring force 0.75 mN (standard)
Filter (as per DIN/JIS)	Gaussian filter, Ls filter
Standards	DIN/ISO/JIS/ASME/MOTIF
Parameters	DIN/ISO: Ra, Rq, Rz, Rmax, Rp, Rv, Rpk, Rk, Rvk, Mr1, Mr2, A1, A2, Vo, Rt, R3z, RPc, Rmr (3x), HSC, RSm, Rsk, Rdc, Rdq, Rku, Pa, Pt, Pmr (3x), Pdc, Wa, Wq, Wt, WSm, Wsk
	JIS: Ra, Rz, RzJIS94, Sm, S
	ASME: RpA, Rpm
	MOTIF: R, AR, Rx, W, AW, Wx, Wte, CR, CF, CL, NR, NCRX, NW, CPM
Cutoff lc (as per ISO/JIS)	0.25 mm; 0.8 mm; 2.5 mm; automatic
Traversing length Lt (as per ISO/ JIS)	1.75 mm; 5.6 mm; 17.5 mm automatic, free input
Traversing length (as per MOTIF)	1 mm; 2 mm; 4 mm; 8 mm; 12 mm; 16 mm
Overall measuring length mm (as per ISO/JIS)	1.25 mm; 4.0 mm; 12.5 mm
Number n of traversing lengths (as per ISO/JIS)	Selectable: 1 to 5
Shorter cutoff (as per ISO/JIS)	Selectable
Contacting speed	0.2 mm/s; 1 mm/s
Profile resolution	Measuring range (standard probe arm length): ±250 µm = 8 nM ±25 µm = 0.8 nM
	Double probe arm length: ±500 µm = 16 nM
Languages	German, English, French, Italian, Spanish, Portuguese, Dutch, Swedish, Russian, Polish, Czech, Japanese, Chinese, Korean, Hungarian, Turkish, Romanian
Memory	Max. 30 profiles, max. 40,000 results
Miscellaneous	Lock/code number protection, date/time, printer integrated, dynamic measuring function

Compact skidded probe system for straightforward roughness measurement

Horizontal, vertical or overhead – the PocketSurf allows you to easily measure in any position depending on your purpose. Even difficult-to-reach surfaces, e.g. on the inner and outer diameters, are accessible. Select one of the two device options with either a stylus tip 5 µm / .0002" or 10 µm / .0004" for even more flexibility.

- Measured path corresponding to 1, 3 or 5 times the cutoff wavelength
- 0.8 mm / 0.030" adjustable
- Four locking probe positions – axial or at angles of 90°, 180° or 270°
- MarConnect data output for simple data transmission, compatible with common data recording systems
- Messages indicating when ranges exceeded or undershot
- Sturdy housing made of cast aluminum for accurate and reliable measurement operation over many years
- Reading of all the parameters after the measurement is completed

5 µm

10 µm

Stylus tip
(Variant selectable)

4

Selectable parameters:
Ra, Rmax/Ry, Rz

9 V

Battery
for improved service life

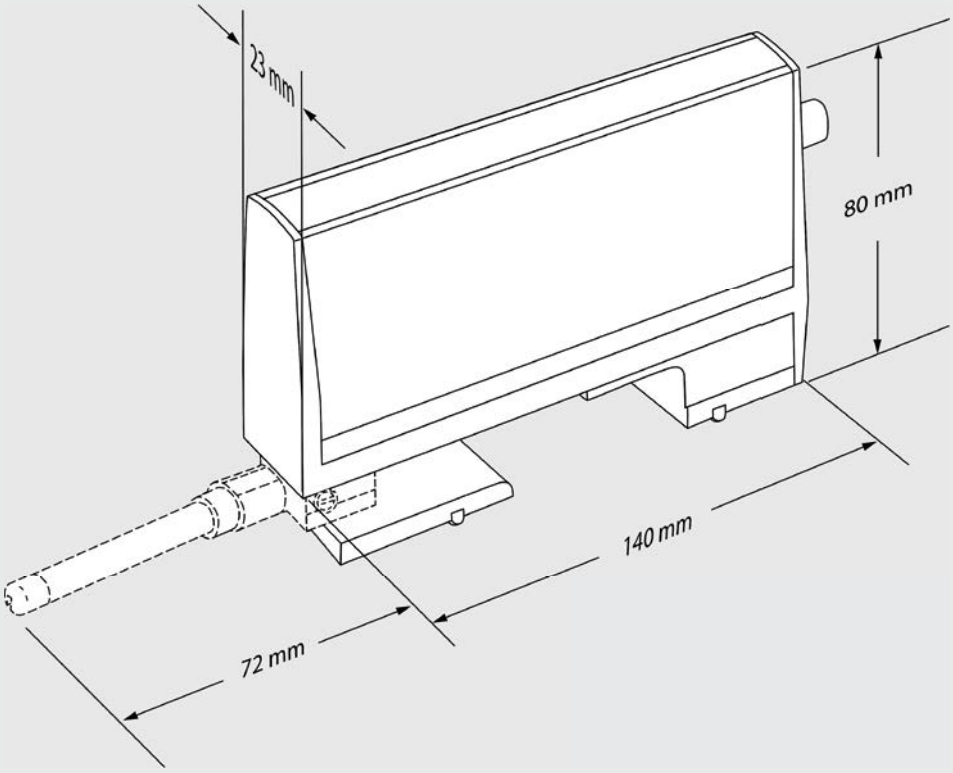
PocketSurf IV

Roughness measurement with measuring tripod

Device information

MarSurf PocketSurf IV

Item no. 2191802 (5 µm Stylus tip) | Item no. 2191800 (10 µm Stylus tip)

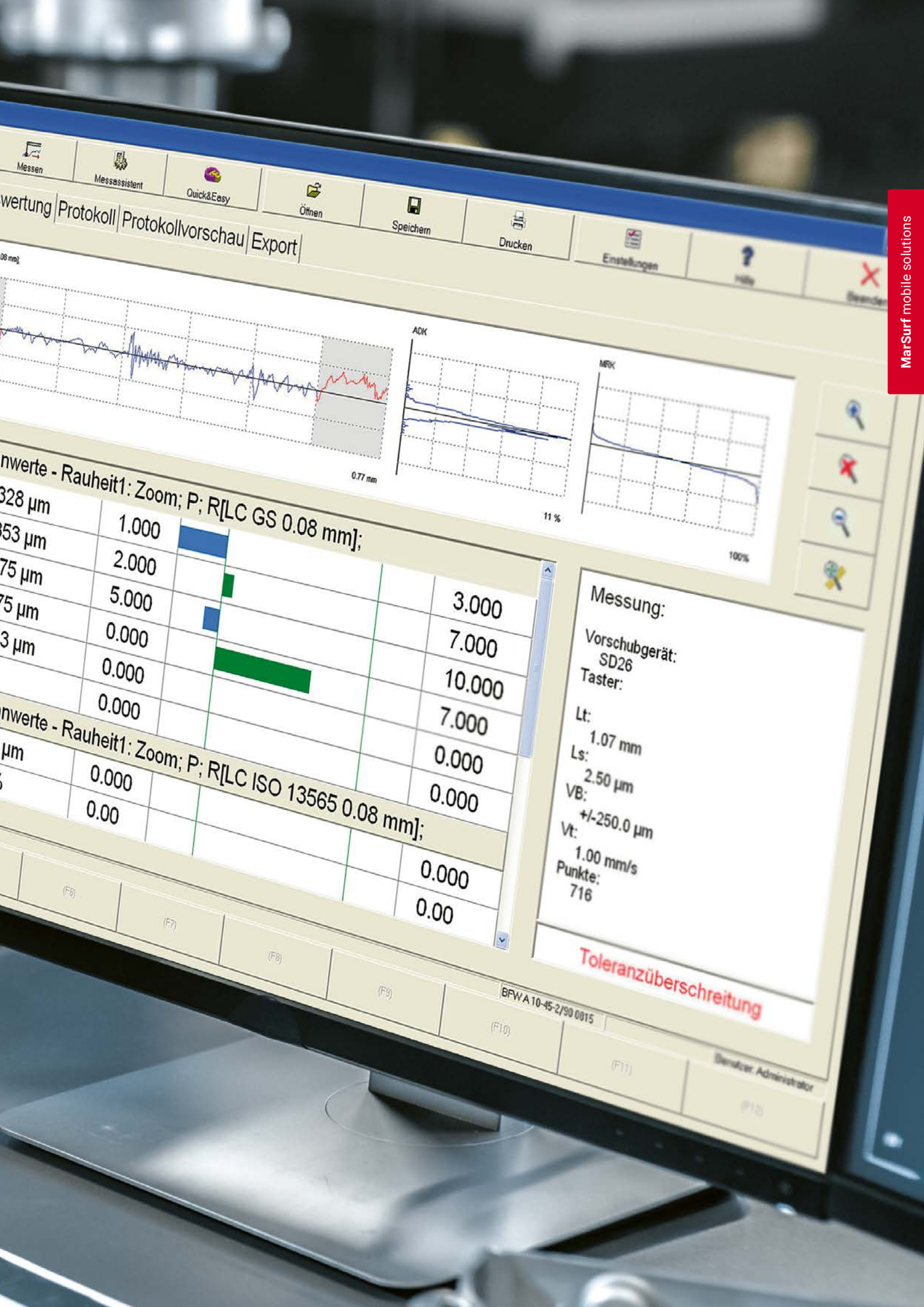


Measuring principle	Stylus method
Probes	Piezoelectric skidded probe
Parameters	Ra, Ry, Rmax, Rz
Unit of measurement	metric/inches
Measuring range	Ra - 6.35 µm / 250 Ry, Rmax, Rz - 25.3 µm / 999 µin
Profile resolution	0.01 µm / 1 µin
Number n of sampling lengths as per ISO/JIS	Selectable: 1 to 5
Stylus tip	5 µm / .0002“ (Item no. 2191802)
	10 µm / .0004“ (Item no. 2191800)
Measuring force (N)	15
Data interface	RS-232C, USB
Battery	Battery, 9 V
Dimensions	140 x 76 x 6.35 mm

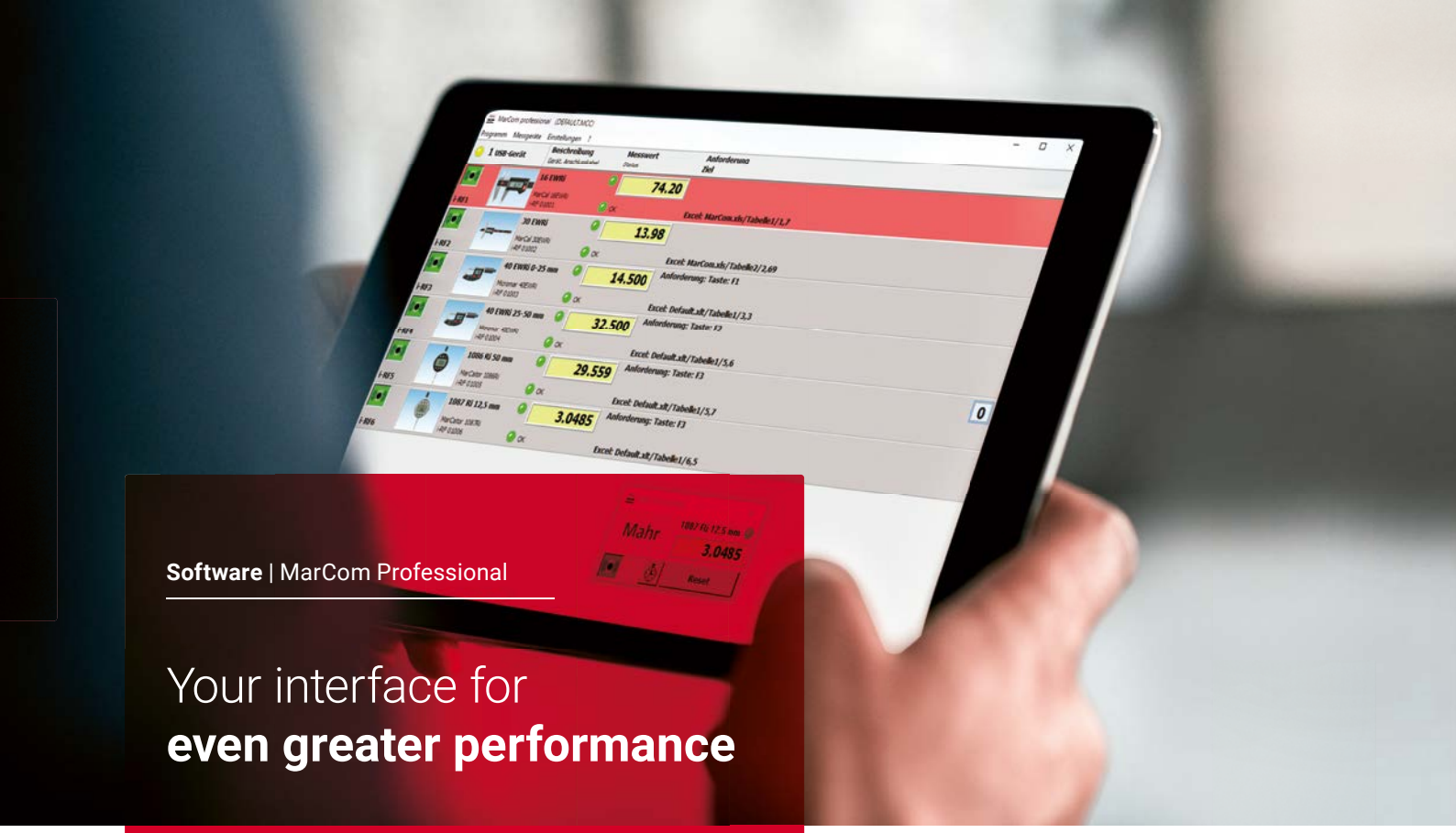
Valuable additions for your measuring tasks

Equally as important as the quality of a measuring instrument is the software with which the recorded data is processed. With MarProfessional and MarWin Easy Roughness, Mahr offers you intuitive user guidance, numerous options for data analysis, as well as subsequent further processing.

Even the accessories of a piece of measuring equipment do often not only consist of replacement parts but rather expand your room for maneuvering thanks to additional or more accurate measuring options for your device.



MarSurf mobile solutions



Software | MarCom Professional

Your interface for **even greater performance**

Two steps to the goal: Combine your measuring instruments with the multifunctional MarCom Professional software. This versatile interface tool combines data acquisition and data transfer with your data processing in a straightforward way. How you process the collected data is entirely up to you.

Choose your output format from the following options:

- Virtual interface box: CAQ/SPC software
- Intelligent Excel interface: Microsoft Excel
- Emulation keyboard: any Windows software
- Text file: flexible data processing

Powerful and user-friendly

Perfectly coordinated: MarCom Professional is the ideal data transfer software for your quality assurance and manufacturing needs. A number of useful functions offer users maximum convenience when recording and transferring measurements.

MarCom Professional is the ideal data transfer software for your quality assurance and manufacturing needs. Advantages:

- IATF ready: transfers and displays the measuring equipment ID as well as item and serial number to clearly allocate the measuring equipment to the measurements
- Tab settings in up to 3 areas: settings, device parameters and goal
- Scalable measurement value display
- Manual drag and drop sorting of device overview
- Additional values are transferred to supplementary columns
- Device parameters can be preset: reference values as well as function locks can be queried and changed on the instrument

Established software
for any situation

The MarWin software platform from Mahr has established itself as a measuring and evaluation software package in over sixty countries and is used by many Mahr reference customers. It is the overarching software base for numerous Mahr product families (MarSurf, MarForm and MarOpto). MarWin Easy Roughness is your first choice for all MarSurf applications thanks to its versatile customization and design options and comprehensive functions.

Compatible with all PC-based MarSurf applications.

"Evaluation" screen: Result with profile, AD curve, Mr curve and tolerance monitoring

"RoughnessPlus" section:. Virtual rulers to interactively set distances in X and Z direction in the profile field

Advantages:

- Easy to operate with many measuring and evaluation criteria
- Predefined, standardized thread parameters and curves for quick and reliable operation
- Detailed result records with profile, AD curve, Mr curve and tolerance monitoring
- Integrated measuring assistant: strategic setting of measuring conditions for certain measuring tasks including instructions to guide the user
- Select from over 80 parameters for R, P and W profiles according to current ISO/JIS or MOTIF standards (ISO 12085)
- Automatic functions for choosing cut-off and traversing length in accordance with standards (patented)

Clever combination:
MarSurf M 310 and MarWin

The MarSurf M 310 can be used as a drive unit together with MarWin Easy Roughness software. It can be easily connected to the computer by cable or Bluetooth wireless technology.
This use combines the handiness of the MarSurf M 310 with the wider range of functions of the software. It allows you to evaluate even more parameters and optimally analyze your measuring results without compromising on flexibility and ease of use.

MarSurf M 310 PC version with MarWin (basic version)

Measuring station consisting of MarSurf M 310 (2 µm stylus tip) and MarWin Easy Roughness software; PC not included in set

Order number: 6910295

For profile values and surface parameters such as R, Rk, P, W, MOTIF and D including export to text file (ASCII). With profile wizard for USB instruments and tolerance monitoring on screen and in the measuring record.

Highlights
at a glance

Multiple measurements

Measurement of twin contours and multiple measurements with segmentations. Depending on the drive unit selected and the measuring stand, it is possible to perform an automatic zenith search, have absolute and relative positioning and program automatic processes. The software provides a measuring station with operating messages and sometimes photos between measurements.

Profile processing

This function makes it possible to process profiles such as cutting out valleys or peaks, simulating spheres, mirroring profiles, rotating profiles, adding ranges or merging two or more profiles into a new one. In addition, edge filters hide topics that are not to be evaluated.

Virtual rulers

Interactive setting of distances in X and Z direction in the profile field make it possible to view defined profile sections.

Start program sequences using function keys

Click to activate results, profiles, globally standardized parameters and characteristic curves. They are output in the record. The entries can be selected directly from the “Surface parameters”, “Evaluation”, “Measuring record”, and “Record preview” tabs, making the system quick and easy to use.

Other features

- User administration for logging on and administering users with different rights
- Statistics
- Automatic export of profile files, results files and records in PDF format
- Interactive zoom to specify a profile section to be evaluated and recalculate selected parameters

One software, many possibilities

Digital I/0 option

Order number: 6268392

For all MarWin software, digital I/O box with 8 inputs/8 outputs, license “Digital I/O” and remote control functionality e.g. via PLC to integrate the MarWin measuring station into a production process.

Profile processing option

Order number: 6292269

With the three functional areas: edge filters to hide areas, profile processing (e.g. cutting out valleys or peaks, simulating spheres, mirroring profiles, rotating profiles, adding additional areas etc.) as well as merging two or more profiles into a new one.

User-defined parameters option

Order number: 6292270

To integrate customer-specific parameters programmed by Mahr application engineering.

ISO 13565-3 parameter option

Order number: 6292263

To evaluate special parameters Rpq, Rmq and Rvq as per ISO 13565-3. To evaluate special parameters Rpq, Rmq and Rvq as per ISO 13565-3.

QS-STAT option

Order number: 6292268

For easy export of features as per Q-DAS including manual support of 31 AutoKeys.

QS-STAT Plus option

Order number: 6292271

For exporting features as per Q-DAS and manual and the possibility of changing the type, length and description, for example, as well as including customer requirements and/or measuring programs.

Dominant waviness option

Order number: 6292203

As per VDA 2007: 2007-02 with calculable thread parameters WDSm, WDc and WDt.

Mobile roughness measurement

Valuable additions **Spare parts and accessories**

Spare part components of a piece of measuring equipment are often not simply spare parts when it comes to a defect. Much more than that, they expand your room to maneuver as a metrologist by offering you additional or more accurate measuring options for your instrument.

PHT3-350

Order number: 6111521

Compatible with MarSurf PS 10 and M 310

- System: single-skid probe
- Skid radius: in tracing direction 25 mm, perpendicular 1.45 mm
- Floating point: 0.9 mm in front of the stylus
- Measuring range: 350 µm
- Specifications: for holes starting at 3 mm Ø, to 17 mm depth, min. workpiece length = traversing length + 1 mm

PHT11-100

Order number: 6111524

Compatible with MarSurf PS 10 and M 310

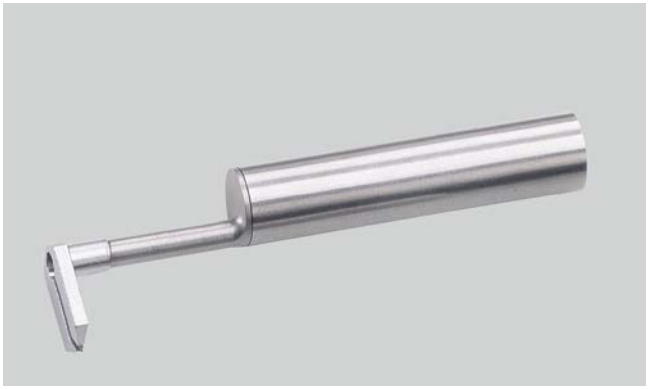
- System: single-skid probe
- Skid radius: in tracing direction 25 mm, perpendicular 2.9 mm
- Floating point: 0.8 mm in front of the stylus
- Measuring range: 100 µm
- Specifications: for flat surfaces, bores starting at 11 mm Ø to 14 mm depth, grooves from 2.5 mm width and up to 7.5 mm depth

PHTF 0.5-100

Order number: 6111522

Compatible with MarSurf PS 10 and M 310

- Calibration using PGN geometry standard
- System: single-skid probe
- Skid radius: in tracing direction 25 mm, perpendicular 1.45 mm
- Floating point: 0.6 mm next to the stylus
- Measuring range: 100 µm
- Specifications: e.g. for tooth flanks starting from module 0.8



PHTR-100

Order number: 6111525

Compatible with MarSurf PS 10 and M 310

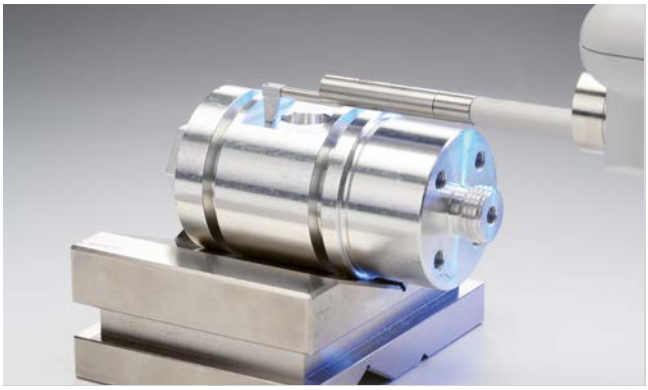
- System: single-skid probe with side skid
- Skid radius: 0.3 mm in tracing direction
- Stylus: 2 µm, 90°
- Specifications: for measurements on concave and convex surfaces
- Calibration: using PGN geometry standard

PT150

Order number: 6111523

Compatible with MarSurf PS 10 and M 310

- System: dual skid probe
- Skid radius: in tracing direction 50 mm, perpendicular 3 mm
- Floating point: 4.5 mm in front of the stylus
- Measuring range: 150 µm
- Specifications: for sheets and roller surfaces



Probe extension PHT

Order number: 6850540

Compatible with MarSurf PS 10 and M 310

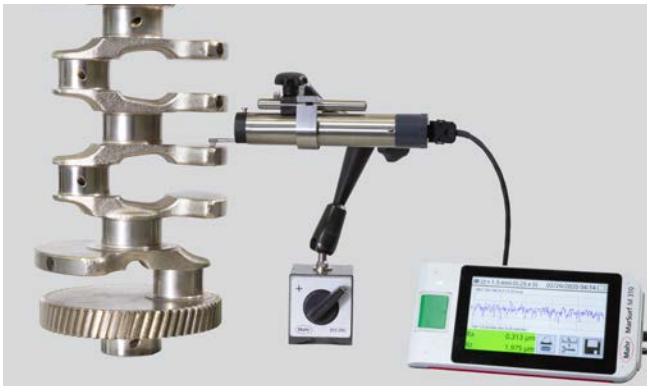
Probe extension PHT (80 mm) for P probes, e.g. for measuring points located deep inside cylinders

Magnetic fixture

Order number: 6850500

Compatible with MarSurf PS 10 and M 310

Magnetic fixture to directly attach the MarSurf M 310 to magnetic measuring objects (e.g. plates and rollers)



Measuring stand 815 MA

Order number: 4416000

Compatible with MarSurf PS 10 and M 310

- Support arm with two joints
- Powerful ON/OFF magnet
- Magnetic force transferred via flat and prismatic base and front of the machine base
- Stainless steel column and support arm
- Fine adjustment at support arm

Measuring stand ST-D

Order number: 6710803

Compatible with MarSurf PS 10 and M 310

- Height adjustment of holder using handwheel 0 up to 300 mm
- Dimensions: 175 x 190 x 385 mm
- Weight: approx. 3 kg

Handheld support

Order number: 6910434

Compatible with MarSurf PS 10 and M 310

Handheld support for manual use with prismatic contact surfaces for versatile options

Extra: Height adjustment for handheld support (pair)

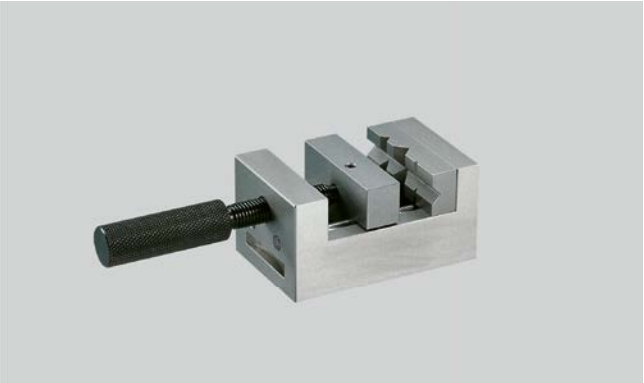
Order number: 6850720

Case PS 10 / M 310

Order number: 7012054 for MarSurf M 310, 6910252 for MarSurf PS 10

Compatible with MarSurf PS 10 and M 310

Case for transportation and storage



PPS parallel vise for clamping measuring objects

Order number: 6710604

Compatible with MarSurf PS 10, M 310 and M 400

- Jaw width: 70 mm
- Jaw height: 25 mm
- Span width: 40 mm
- Total height: 58 mm
- Weight: 2 kg

Collet chuck for perpendicular measurements

Order number: 6850738

Compatible with MarSurf PS 10 and M 310

Collet chuck for MarSurf PHT drive C2, for precise measurements in transverse direction in the production process for Ø 5 mm to 80 mm (with probe protection 6850724 for Ø 100 mm)

Probe protection, steel

Order number: 6850716

Compatible with MarSurf PS 10 and M 310

Other probe protection:

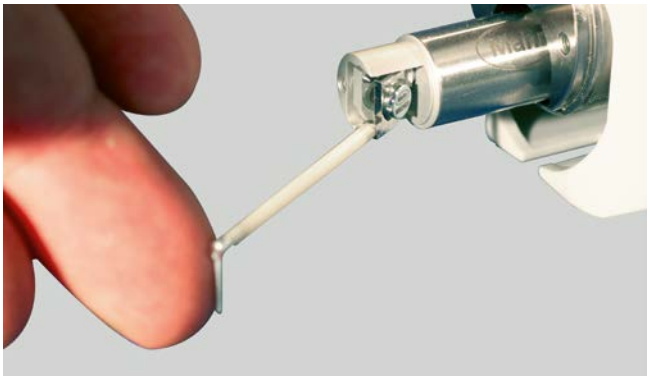
With V-block attachment, steel | Order number: 6850715

Plastic* | Order number: 7028532

With V-block attachment, plastic** | Order number: 7028530

* Included with M 300 set

** Included with M 300 and M 300 C



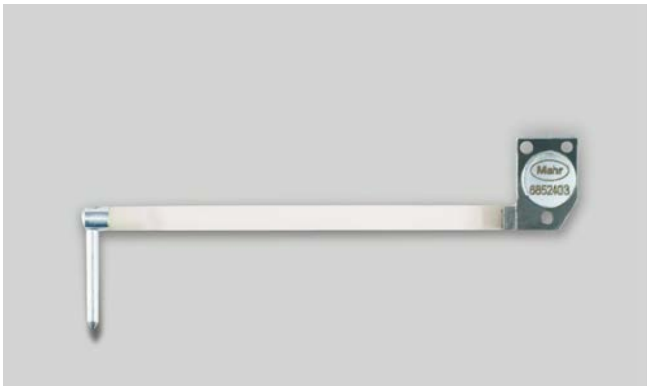
BFW probe head

Order number: 6852401

Probe system firmly integrated into drive unit SD 26. Compatible with MarSurf PS 10 and M 310

- Measuring range: with 45 mm probe arm length ± 250 µm, with 90 mm probe arm length ± 500 µm
- Low measuring force of approx. 0.75 mN
- High probe linearity: < 1 %

Magnetic probe arm holder for smooth probe arm changing without tools offers additional probe arm protection.



BFW probe arm A 10-45-2/90°

Order number: 6852403

Compatible with MarSurf M 400

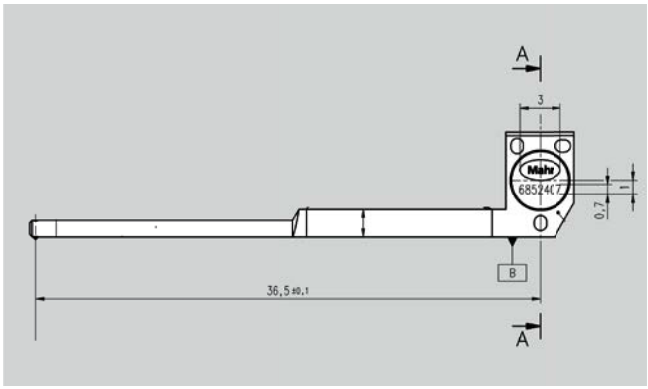
- For bores from Ø 11 mm
- Probe included in standard set
- Stylus tip radius / Material: 2 µm / Diamond
- Cone angle of stylus tip: 90°
- Measuring range: ±250 µm
- Length A (length beneath probe arm): 8.0 mm
- Length B (length to center of holder): 36.5 mm
- Can be used for holes from Ø 11 mm: approx. 30.0 mm

BFW probe arm A 0.7-45-2/90°

Order number: 6852408

Compatible with MarSurf M 400

- For holes from Ø 0.9 mm
- Stylus tip radius / Material: 2 µm / Diamond
- Cone angle of stylus tip: 90°
- Measuring range: ±250 µm
- Length beneath probe arm: 0.1 mm
- Length to center of holder: 36.5 mm
- Can be used for bores from Ø 0.9 mm: approx. 10.0 mm
- Bores from Ø 2.5 mm: approx. 30.0 mm

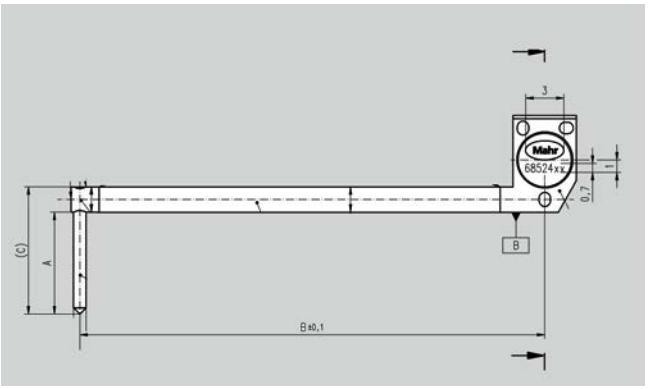


BFW probe arm A 1.4-45-2/90°

Order number: 6852407

Compatible with MarSurf M 400

- For bores from Ø 1.5 mm
- Stylus tip radius / Material: 2 µm / Diamond
- Cone angle of stylus tip: 90°
- Measuring range: ± 250 µm
- Length A (length beneath probe arm): 0.2 mm
- Length B (length to center of holder): 36.5 mm
- Can be used for bores from Ø 1.5 mm: approx. 30.0 mm

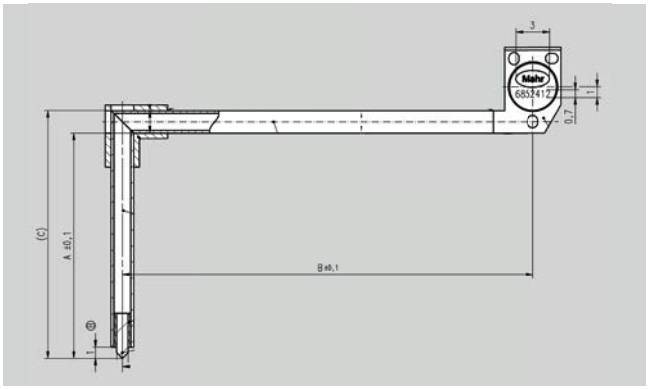


BFW probe arm A 4-45-2/90

Order number: 6852404

Compatible with MarSurf M 400

- For bores from Ø 4.5 mm
- Stylus tip radius / Material: 2 µm / Diamond
- Cone angle of stylus tip: 90°
- Measuring range: ±250 µm
- Length A (length beneath probe arm): 2.0 mm
- Length B (length to center of holder): 36.5 mm
- Can be used for bores from Ø 4.5 mm: approx. 30.0 mm

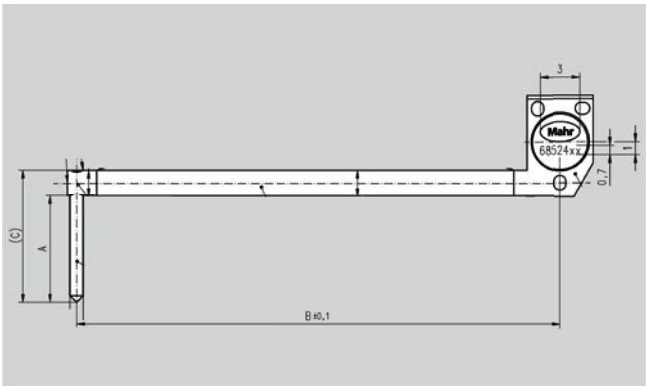


BFW probe arm A 22-45-2/90°

Order number: 6852412

Compatible with MarSurf M 400

- For depressions up to approx. 20 mm
- Stylus tip radius / Material: 2 µm / Diamond
- Cone angle of stylus tip: 90°
- Measuring range: ±250 µm
- Length A (length beneath probe arm): 20.0 mm
- Length B (length to center of holder): 36.5 mm
- Can be used for holes from Ø 23 mm: approx. 30.0 mm



BFW probe arm A 10-135-2/90°

Order number: 6852411

Compatible with MarSurf M 400

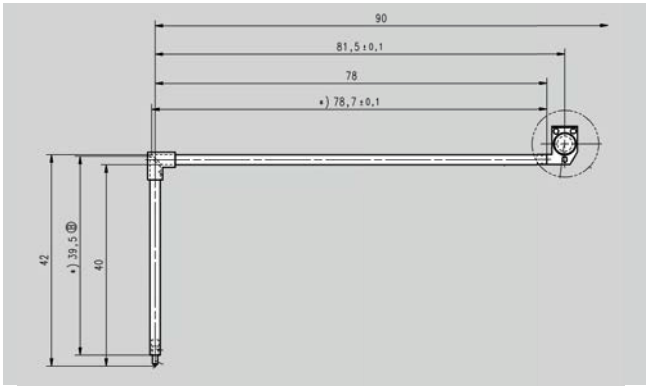
- For measuring range ± 750 µm
- For bores from Ø 11 mm
- Stylus tip radius / Material: 2 µm / Diamond
- Cone angle of stylus tip: 90°
- Length A (length beneath probe arm): 8.0 mm
- Length B (length to center of holder): 126.5 mm
- Can be used for holes from Ø 11 mm: approx. 123 mm

BFW probe arm A 4-90-2/90°

Order number: 6852406

Compatible with MarSurf M 400

- For bores from Ø 4.6 mm
- Stylus tip radius / Material: 2 µm / Diamond
- Cone angle of stylus tip: 90°
- Measuring range: ±500 µm
- Length A (length beneath probe arm): 2.0 mm
- Length B (length to center of holder): 81.5 mm
- Can be used for bores from Ø 4.6 mm: approx. 75.0 mm

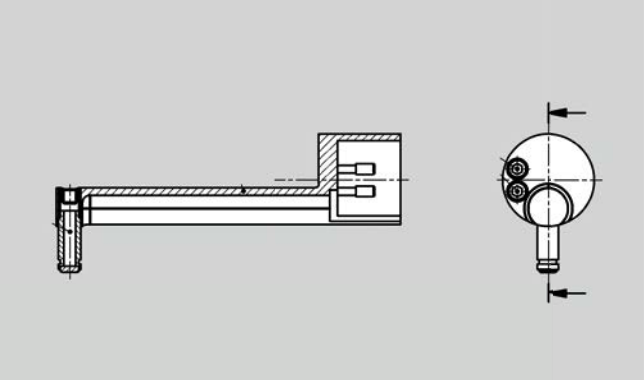


BFW probe arm A 42-90-2/90°

Order number: 9048671

Compatible with MarSurf M 400

- For depressions up to approx. 40 mm
- Stylus tip radius / Material: 2 µm / Diamond
- Cone angle of stylus tip: 90°
- Measuring range: ±500 µm
- Length A (length beneath probe arm): 40.0 mm
- Length B (length to center of holder): 81.5 mm
- Can be used for bores from Ø 43 mm approx. 78.0 mm



Skid for BFW probe arms

Order number: 6852402

Compatible with MarSurf M 400
Only for default probe arm

Total length: 46.4 mm

USB scanner Xenon 1900

Order number:3028620 (cable version), 3028820 (Bluetooth version)

Compatible with MarSurf M 310

Area imaging scanner to record barcodes/ QR codes in conjunction with the MarWin Easy Roughness software

Vee-block PP XY-table

Order number: 6710401

Compatible with MarSurf PS 10, M 310 and M 400

- Vee-block PP with four different vee-blocks to hold turned parts for testing diameters from 1 mm to 160 mm
- Dimensions (mm): 80 x 100 x 40
- Weight: 1.5 kg
- Includes tension springs to clamp light measuring objects in the vee-block

XY-table

Order number: 6710529

Compatible with MarSurf PS 10, M 310 and M 400

- To hold and align measuring objects
- Can be moved 15 mm in two coordinates
- Table surface (mm): 120 x 120 with two quick clamping shoes in the vee-block

Testing and geometry standard (ISO 5436-1, C3) including DAkkS / DKD calibration certificate

Order number: 6820520

Compatible with MarSurf PS 10 and M 310

- Rz, Rmax 9.5 µm, Ra 3.0 µm
- RSm 100 µm
- Large measuring surface

Precision vises 109 PS, set

Order number: 4246819

Compatible with MarSurf PS 10, M 310 and M 400

- With mini precision vise sets, V-blocks, carrier plates, tripods and mini indexing heads in the plastic case
- Jaw width: 15 / 25 / 35 mm

Roughness standard PRN 10

Order number: 6820420

Compatible with MarSurf PS 10, M 310 and M 400

- Including Mahr calibration certificate
- Surface standard with turned profile, chrome-plated, profile approx. 10 µm
- For testing the roughness measuring station

MSS 3 Mahr surfaces combi standard ISO 5435-1, Type A1 and C3

Order number: 9047438

Compatible with MarSurf PS 10, M 310 and M 400

- Cuboid shape with sinus periodic profile, depth adjustment groove, optical flat range
- Metal with nickel layer
- Parameters approx.: depth adjustment groove Pt 12.0 µm, Rmax 3.0 µm, Rz 3.0 µm, Ra 1.0 µm, optical flat surface Rz0 0.02 µm
- No calibration certificate

Removable folding map

Roughness: **Parameters**

Use our practical folding map to keep all relevant parameters on hand – in one place and available at a glance.

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3765690 | 07.2021