

## MarSurf | Surface Measuring Instruments

Careful testing is paramount wherever surface structures affect the function or appearance of components. MarSurf surface measuring instruments offer outstanding quality. Mahr has perfected the stylus method, which has now become established worldwide. We also meet the latest demands for contactless measuring with a range of optical sensors. Mahr's MarSurf surface metrology offers a combination of top quality, maximum competence and perfect expertise.



# MarSurf M 400

## Mobile Surface Measuring Instrument

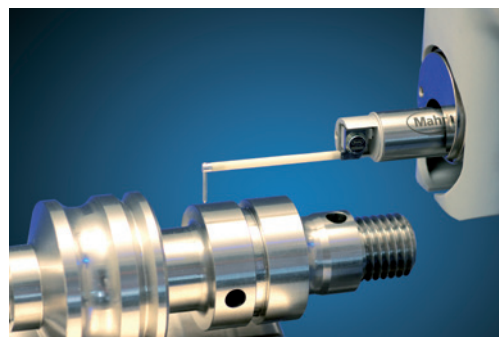
### DESCRIPTION

**MarSurf M 400. The best of the "mobiles"**

- Surface evaluation using skidless tracing is not only needed in the measuring room but is required more and more in production as well.
- This usually means higher demands on operator qualities, more time, more adjustment work.
- In the line of "mobile surface metrology", MarSurf M 400 offers this required scope of performance and at the same time simple and fast operability.
- Mobile and stationary measuring instrument
- Roughness and waviness measurements
- Traversing lengths up to 26 mm
- Over 50 R, W and P surface parameters
- Automatic choice of cut-off and traversing length in accordance with international standards
- Dynamic calibration function
- Cable and Bluetooth connection between drive unit and evaluation instrument (4 m) (MarSurf M 400 C is only with cable connection)
- Magnetic probe holder (break away probe) BFW 250
- Motorized probe zero setting (max. 7.5 mm)

#### Supplied with:

- MarSurf M 400 evaluation instrument
- MarSurf SD 26 drive unit including BFW 250 probe system
- Standard probe arm (6852403)
- 1 roll of thermal paper
- Wide-range power supply unit with 3 adapters
- 2 USB cables (for connecting to the PC and the M 400)
- Operating instructions
- Case



### TECHNICAL DATA

Measuring principle	Stylus method
Probe	BFW skidless system
Measuring range	+/-250 µm (up to +/-750 µm with 3x probe arm length)
Profile resolution	Measuring range +/-250 µm: 8 nm Measuring range +/-25 µm: 0.8 nm
Filter according to ISO/JIS	Gaussian filter as per ISO 11562 Filter as per ISO 13565
Cutoff $f_c$ according to ISO/JIS	0.25 mm, 0.8 mm, 2.5 mm, automatic, variable
Number n of sampling length according to ISO/JIS	1-5
Contacting speeds	0.2 mm/s; 1.0 mm/s
Measuring force	0.75 mN
Surface parameters	Over 50 surface parameters for R, P and W profiles according to current ISO/JIS or MOTIF standards (ISO 12085)

### APPLICATIONS

#### Machine building

- Bearings, shafts, racks, valves

#### Automotive industry

- Steering, brake system, gearbox, crankshaft, camshaft, cylinder head, cylinder block, turbocharger

#### Steel industry

- Measurement of sheet metal surfaces
- Measurement of roller surface

#### Medicine

- Surface roughness measurement for hip and knee endoprostheses

#### Aerospace

- Turbine components

### ACCESSORIES

#### Measuring stand

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

#### Other accessories

- CT 120 XY table, parallel vise, V-block
- Assorted probe arms for the BFW probe system



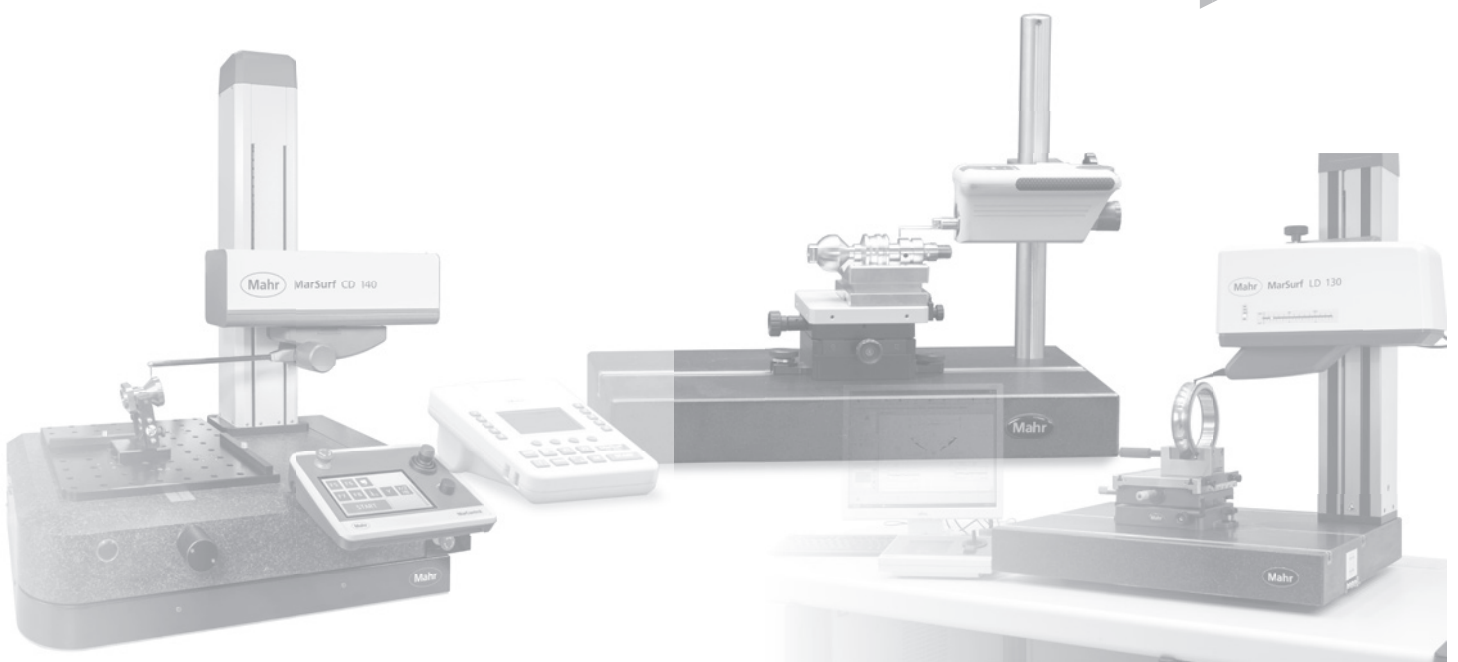
For more information, please visit our website: [www.mahr.com](http://www.mahr.com)

## MarSurf Surface Measuring Instruments



Portable Surface Roughness Measurement

Portable and Stationary Surface Measurement  
for Roughness Depth and Contours



## MarSurf. PC-based stationary Surface Measuring Stations

Versatile and Powerful in Measuring Rooms and Laboratories

PC-based surface measuring instruments represent the cutting edge in surface measurement and evaluation incorporating international standards, versatile evaluation methods, comprehensive documentation, large storage capacity, data export/import and networking with other systems. Extensive Quality Assurance procedures guarantee the highest quality and stability of software and hardware.



# MarSurf XR 1 Roughness Measuring Station

## DESCRIPTION

**MarSurf XR 1. The ideal instrument for a low-cost introduction to user-friendly surface metrology.**

The PC-based instrument delivers all common surface parameters and profiles in accordance with international standards, both in the measuring room and in production. MarSurf XR 1 from Mahr stands for innovative roughness evaluation software.



- Over 80 surface parameters for R-, P- and W-profiles according to current ISO/JIS or MOTIF standards (ISO 12085)
- Bandpass filter Ls in accordance with current standard; Ls can also be switched off or varied as required
- Comprehensive measuring records
- Teach-in methods for the rapid creation of Quick&Easy measuring programs
- Automatic functions for choosing cut-off and traversing length in accordance with standards
- Support for various calibration methods (static and dynamic) by specifying the Ra or Rz parameter
- Adjustable maintenance and calibration intervals
- Multiple measuring station configurations for custom applications
- Range of options provide system flexibility
- Various user levels protect the device against misuse and prevent unauthorized people from using it

### Drive units and probe options:

- Skidded or skidless tracing
- Drive units MarSurf GD 26 and/or MarSurf SD 26 and/or MarSurf RD 18

### Supplied with:

- MarSurf XR 1, Software MarWin EasyRoughness, Mahr license key with standard license
- Drive unit adapter
- All-in-one PC optional
- MarSurf SD 26 and/or RD 18 drive unit set including probe system
- MFW 250 B probe system set
- MarSurf ST-G measuring stand
- CT 120 XY table

## TECHNICAL DATA

XR 1	
Measuring principle	Stylus method
Probe	BFW skidless system with MarSurf SD 26 drive unit and/or PHT skidded system with MarSurf RD 18 drive unit
Measuring range	+/-250 µm (up to +/-750 µm with 3x probe arm length) applies to BFW system 350 µm applies to PHT probe system
Filter according to ISO/JIS	filter as per ISO 16610-21(replaced Gaussian filter as per ISO 11562), robust Gaussian filter as per ISO 16610-31
Number n of sampling length according to ISO/JIS	1 to 50 (default: 5)
Traversing lengths	MarSurf GD 26 / SD 26: Automatic; 0.56 mm*; 1.75 mm; 5.6 mm; 17.5 mm, 56 mm, Measurement up to stop, variable * Traversing length dependent on drive unit RD 18: Automatic; 1.75 mm; 5.6 mm; 17.5 mm
Measuring force	0.75 mN
Surface parameters	Over 80 surface parameters for R, P and W profiles according to current ISO/JIS or MOTIF standards (ISO 12085)

## APPLICATIONS

### Machine building

- Bearings, shafts, racks, valves, various components from the engineering and precision engineering industry

### Automotive industry

- Steering, brake system, gearbox, crankshaft, camshaft, cylinder head, cylinder block, turbocharger

### Medicine

- Surface roughness measurement for hip and knee endoprostheses

### Aerospace

- Turbine components

### Optics

- Various optical components

## ACCESSORIES

### General software options

- Dominant waviness (WDc) for MarWin
- ISO 13565-3 surface parameters
- QS-STAT / QS-STAT Plus
- Profile processing
- User defined parameters between operator and authorized personnel
- Contour 1 for MarSurf XR 1 / XR 20 (in conjunction with MarSurf SD 26 drive unit)
- All options on one MLK

### Software options

- Option RoughnessPlus
- Option MeasurementPlus
- Digital I/O set



For more information, please visit our website: [www.mahr.com](http://www.mahr.com)

## MarSurf CNC modular

### DESCRIPTION

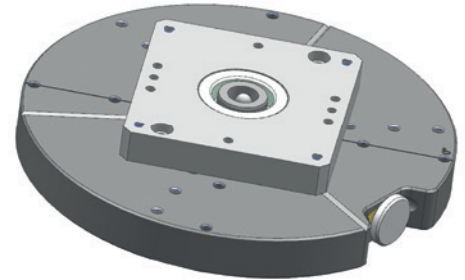
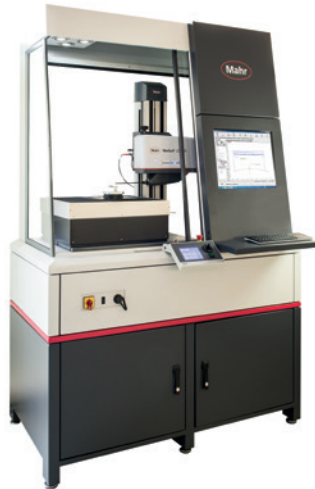
**MarSurf CNC modular.** CNC measuring stations based on standard components

A standard surface measuring station can be expanded into a user-friendly, semi-automatic CNC measuring station simply by adding auxiliary table axes and possibly a measuring cabinet.




- Plug-and-play configuration of the control unit
- Easy to operate MarWin Software measuring wizard
- Universal concept for workpiece holder and clamp
- Minimal training required

### Supplied with:

- MarSurf XC 20 measuring station with PCV 200
- Alternatively: MarSurf LD 130 / LD 260 / UD 130 measuring station
- Including midrange CNC controller
- MarSurf ST 500 / 750 CNC measuring stand
- MCP 21 manual control panel
- **Optional table axes**
- T1S-L linear axis 200 mm
- T1S-R rotation axis
- T3S-LLR 3 table axes comprising 2 linear and one rotation axis
- **Optional measuring cabinet**



### TECHNICAL DATA

	<b>T1S-L</b> Linear axis Complete with control module for midrange CNC Displacement path 200 mm Dimensions 510 mm x 200 mm x 200 mm Bearing strength 50 kg
	<b>T1S-R</b> Rotation axis Complete with standard support plate and control module for midrange CNC For use as a TA or TC axis Dimensions 270 mm x 200 mm x 210 mm Bearing strength 30 kg
	<b>T3S-LLR</b> 3 axis combination Complete with standard support plate and control module for midrange CNC Multiaxis, monolithic structure comprising axes TX, TY, TC Bearing strength 30 kg

### APPLICATIONS

- Measurement close to the production area
- Pallet measurement
- Topography measurement
- Multiple measuring points on one part without reclamping
- Automatic X-axis alignment
- Universal measuring station for a wide variety of measuring tasks
- Automatic zenith search

### ACCESSORIES

- Table plate with clamping sphere adapter and universal clamping plate
- Standard measuring station upgraded to MarSurf CNC *modular*



For more information, please visit our website: [www.mahr.com](http://www.mahr.com)

## MarSurf Engineered

### DESCRIPTION

#### MarSurf Engineered - Customized Solutions

- From individual workpiece holder or probe arms to fully automatic measuring stations, Engineered Solutions offers a comprehensive portfolio in the area of MarSurf Engineered to simplify the measurement of surfaces.

#### Measuring in the production

- Nowadays, roughness and contour are often measured in the direct vicinity of the production in order to determine quality trends and data almost simultaneously with the products produced. The advantage: Measuring and monitoring take place quickly, process-oriented and, above all, process-reliably.
- Particularly in surface metrology, where measured variables are determined in the  $\mu\text{m}$  range, environmental influences such as temperature, vibrations, acoustics or humidity can have a major impact on the measurement.

#### Measuring stations individually adapted to customer requirements

- The MarSurf Engineered measuring stations – manual or fully automatic – offer a comprehensive professional concept in regards to ergonomics, safety, environmental conditions and combine market leading metrology with the requirements of the customers. Furthermore, the operation is usually carried out by production employees who expect a measuring station that is as robust and easy to operate as possible.
- For example, in conjunction with the probe arm changing device, up to 10 different probe arms of the LD 130 / LD 260 line of drive units can be changed in an automatic sequence. This is unique in the field of surface metrology and saves a lot of time since the program sequences do not have to be interrupted.
- A pallet measurement of several identical workpieces in one automatic cycle can also be realized.
- All measuring stations include a comprehensive service and maintenance concept. This makes it possible for the machines to be quickly ready for operation again if they need servicing, which is indispensable for fast production.

#### The right software for the machine

- With their specially developed intelligent software solutions, MarSurf Engineered measuring stations enable measuring programs to be created on one machine and then copied to identical machines without problems and without further programming. The measuring programs are programmed according to the features to be measured. This means that the machine operator without programming knowledge can create individual process-optimized measuring programs from the features already programmed.

#### Manual solutions should not be underestimated

- It does not always have to be a partially or fully automated measuring solution. Manually operated measuring stations are also justified if they are designed to facilitate and accelerate quality assurance work. The manual measuring system MarSurf Engineered Series 002, which Mahr designed for a customer who produces large workpieces such as cylinder blocks with weights of up to 300 kg, supports the operator by means of an air-bearing positioning system in order to position the workpieces simply and quickly, yet very precisely and finely.
- In combination with the software *Operator Guidance MarSurf Q&E* existing Quick & Easy measuring programs can be combined to measuring sequences. Thus, a comprehensive and well-structured documentation of the measured characteristics of a workpiece can be realized, including data export.



## MarSurf Engineered

### Individual construction of probe arms

- Especially for complex geometries and the associated measuring tasks, it is necessary to design a probe arm that is suitable for the required measurement. The probe arm is a component that touches the workpiece and is therefore responsible for the quality of the measurement. Engineered Solutions strives to enable the measuring tasks with as few as probe arms as necessary and has a long experience in the design of new probe arm geometries in order to perform the daily measurements more efficiently but with high quality.
- Intelligent probe arms, which can ideally replace several probe arms, offer a high potential to simplify the work at standardised measuring stations for the measuring technicians in order to obtain a quicker assessment of the quality of the workpiece.
- The construction of customized probe arms is possible for all drive units of the MarSurf product line within the scope of the technical data of the devices.

### Efficient measurement of large workpieces

- If workpieces are too large to measure with classical measuring instruments or they cannot reach the measuring point, the MarSurf Engineered portfolio offers a variety of specially designed measuring gages for mobile use in the production or in the measuring room. MarSurf Engineered gages are easy and intuitive to use and allow measurements that are impossible to achieve with regular measuring devices. The available gages are already able to measure bore diameters between approx. 6 mm and 170 mm and bore depths between approx. 5 mm and 1000 mm. Depending on the respective application, the gages can be designed for different diameters and depths, so that one gage provides several solutions.

### Your advantages with MarSurf Engineered

- Machine concepts individually adapted to the measuring task to be solved in reference to the workpiece size, weight and geometry – from manual solutions to fully automatic machines to in-line measurements with robot loading.
- The right solution suitable for the respective environment, including the necessary safety modules required
- Operating concept adapted to user group – “one-touch” concept
- Software concepts and user interfaces individually adapted to the measuring station and operator

