Mahr | MOBILE SURFACE METROLOGY

Portable roughness device MarSurf M 310

Martin Adler, Product Management 1D-Length

MarSurf M 310 - guaranteed successful!

- The flexible multi-talent MarSurf M 310 is a handy roughness measuring instrument for mobile use under workshop conditions.
- High-precision measurements using the stylus method allow surface roughness testing on small and large workpieces.
- You are used to working with a smartphone?
  Users with little prior knowledge of quality control will find this skid probe system the perfect companion!

MarSurf M 310

Status LED for charge indication

Large, illuminated 4.3" TFT touch display; rotatable, scratch resistant display

Interface:USB type A socket, micro USB socket, microSD card, **IATF ready** thanks to: MarConnect Duplex

Bluetooth printer for profiles, MRC, ADC curve and results

Start button and Home button

Printer docking station

Probe with removable probe protection

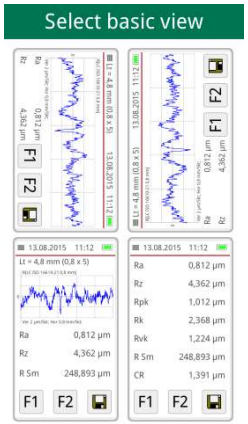
Drive unit, removable

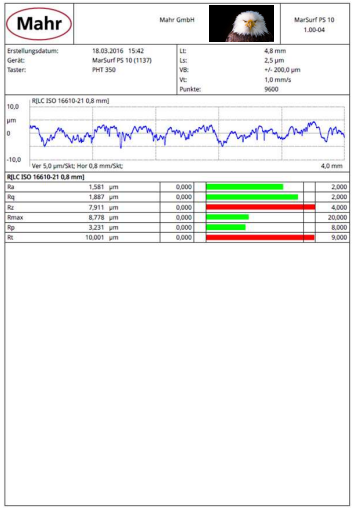
Freely programmable function keys

Integrated, removable calibration standard

FEATURES - operation

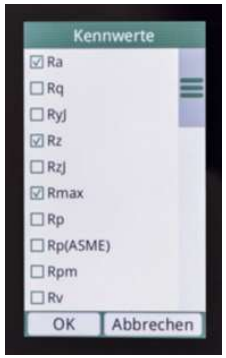
- Large, illuminated 4.3" TFT touch display, rotatable display
- Operation as easy as a smartphone! → saves training effort
- Error-free operation through International Standard-compliant settings
  Automatic cutoff selection ensures the correct measurement results even for non-measurement technicians.
- Logging directly as PDF file in the device → no additional software required
- Input of PDF protocol texts directly on the MarSurf M 310

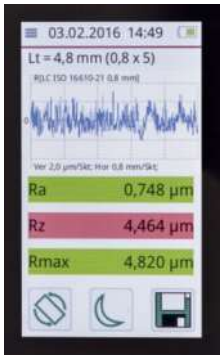


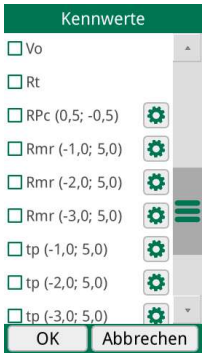


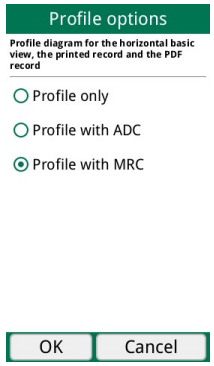
FEATURES - software

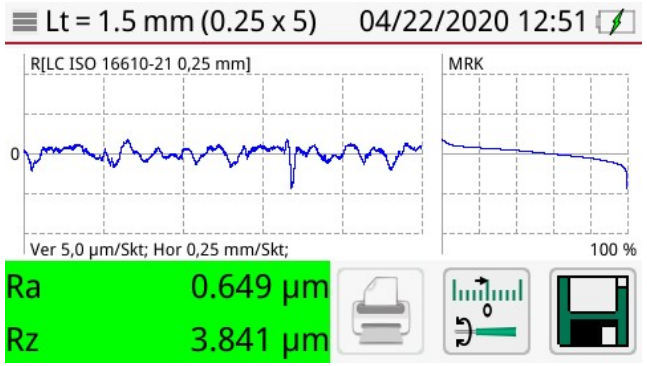
- 36 parameters - offer a performance range like a laboratory instrument.
- Display and printing of the MRC and ADC curve
- For tolerance monitoring, tolerance limits can be set for all selected parameters.
  Exceedances are signaled in the display (and in the protocol).
- Specification of the cutting line C in µm or in % of Rz for the characteristic values Rmr and tp





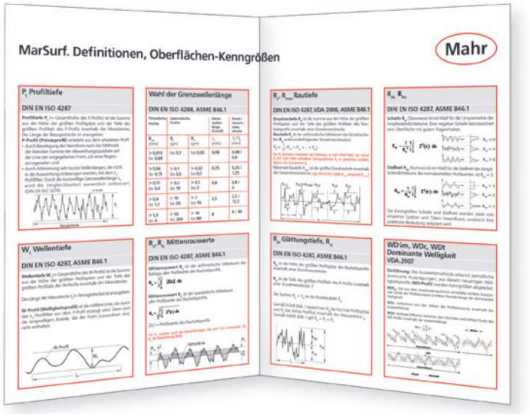


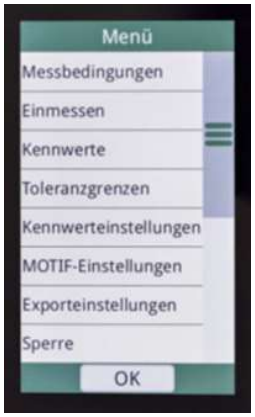


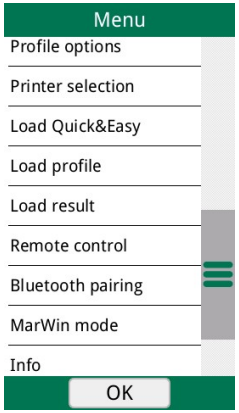


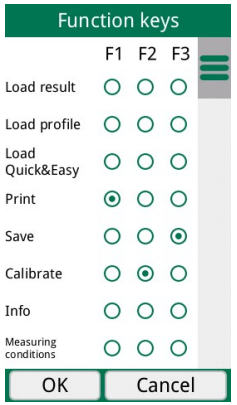
FEATURES - software

- Integrated memory for at least 500,000 measurement results and 1500 PDF protocols Optional data backup on an up to 32 GB microSD card → factor 320.
- You measure according to the Standards and rules for stylus instruments (DIN ISO, ASME, JIS, MOTIF).
- Saving measuring programs (Quick & Easy)
- Assignment of a function or a characteristic variable to the freely programmable keys F1, F2, F3 of the basic view.





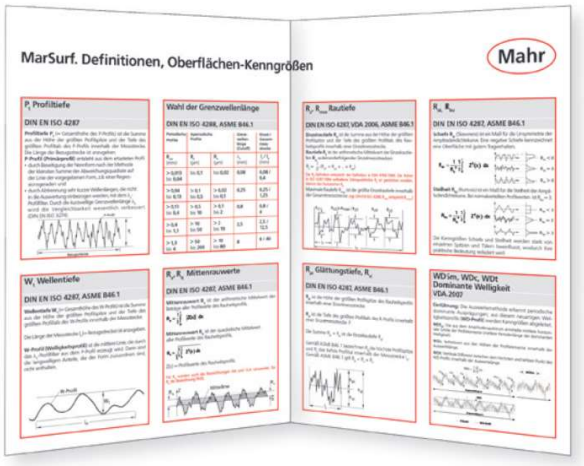




FEATURES - Software

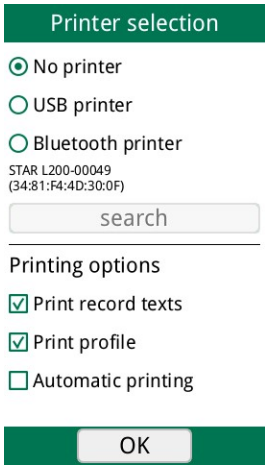
- **New roughness standard DIN EN ISO 21920 1-3**
- ISO 21920 ready - Next year the new roughness standards DIN 21920-1 to 3 will take effect.

  With the MarSurf M 310 you are already on the safe side!



FEATURES - hardware

- USB-/Bluetooth printer with docking station for direct printing of profiles, MRC-, ADC-curve and results
- Detect device status at a glance - two clearly visible status LEDs
- "Mains-independent operation" - over 1,200 measurements without having to recharge the device
- Start button made of oil-resistant plastic



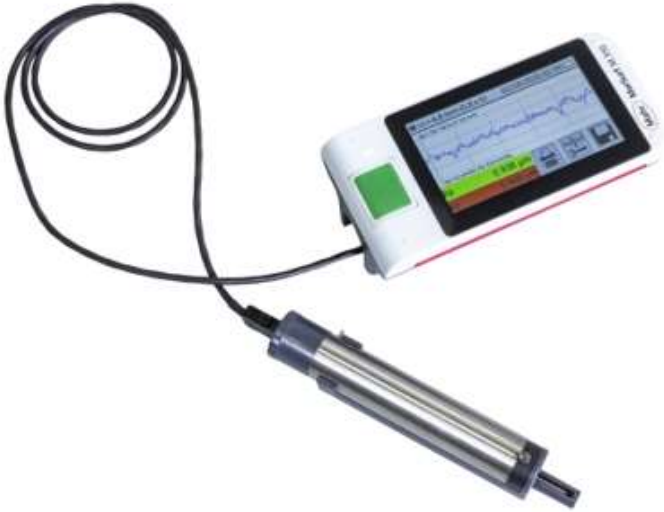
"Charge battery"

"Measurement running",
"Transfer data"

„ Error message“

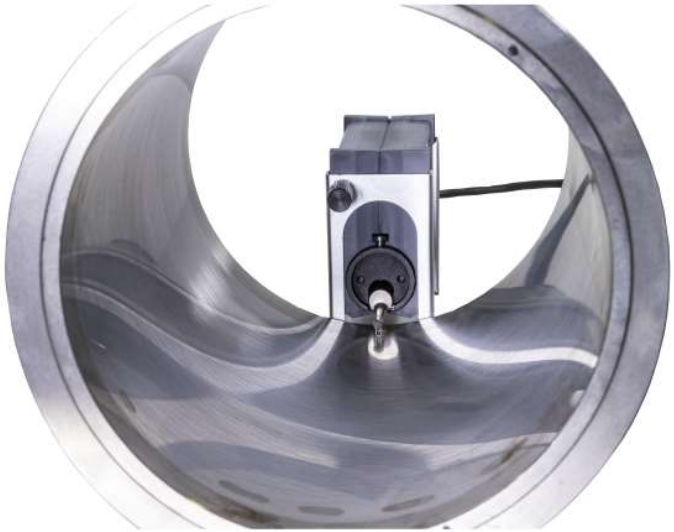
FEATURES - hardware

- Probe, drive unit and evaluation unit form one unit
  → More flexibility because of removable drive unit
  → Height setting adjustment integrated in the housing
- Integrated, removable calibration standard (optional: Dakks/DKD calibrated)
- Sturdy transport case with extensive accessories



FEATURES - hardware

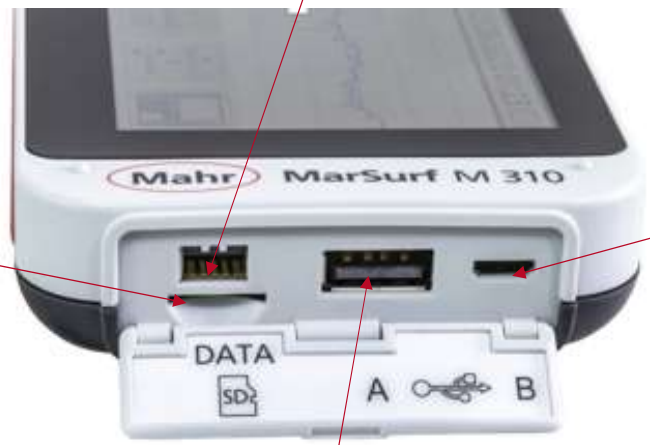
- Probe PHT6-350 → measuring range: 350 µm → probe tip 2 µm (or 5 µm)
- The PHT series probes have an open skid, which largely prevents the deposition of dirt and oils. Contamination can be cleaned with e.g. a hair brush.



Interfaces

- **MarConnect duplex interface -** for the "MarCom Professional" data transmission software

- **SD slot -** for a microSD or microSDHC card (up to 32 GB), on which the profiles, profiles with results, results and/or measurement reports can be stored
- If necessary, a software update can be performed via a microSD card.

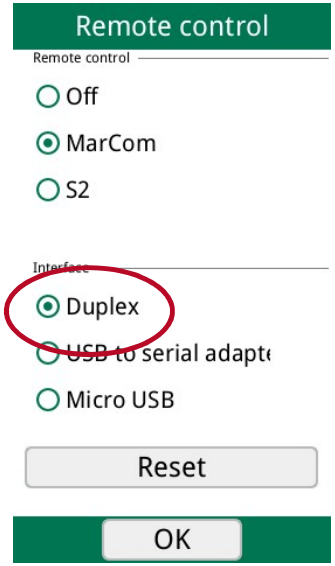


- **USB-A interface -** for connecting e.g. a USB Bluetooth adapter or the USB/Bluetooth printer

- **Micro-USB** interface for connection to the PC. It is treated like a USB memory module (memory stick) and is recognized without drivers.
- For remote control via ASCII commands, e.g. via software for statistical process control or remote start control for automation solutions.

IATF ready – with new MarConnect duplex interface

- Equipped with the proven MarConnect duplex interface, the MarSurf M 310 enables the transmission of a gauge ID with each measurement. This allows you to reliably document which measuring instrument was used to perform a check to ensure the traceability of your measurement results.



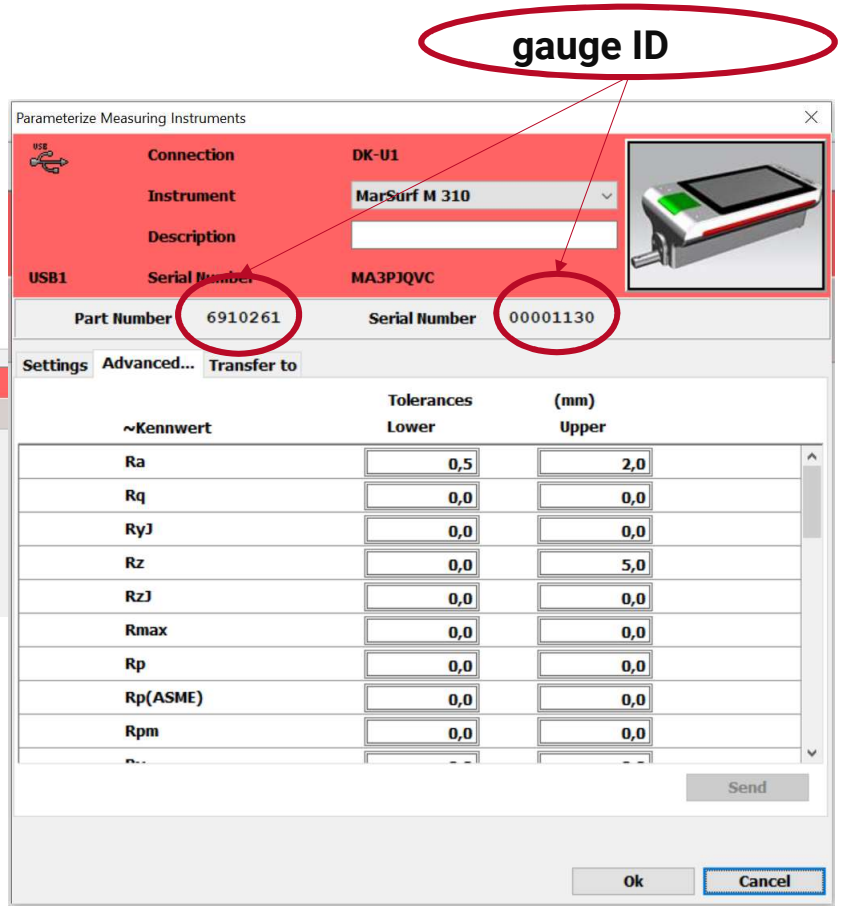
IATF (International Automotive Task Force) ready – Specifically IATF 16949

- IATF 16949 - Quality Management in the Automotive Industry - Requirements for quality management systems for series and spare parts production in the automotive industry
- The new automotive standard was designated IATF 16949 by the IATF (International Automotive Task Force) and was published in October 2016.
- Since 15.09.2018 only IATF 16949 certificates are permitted.
  Since then, certification companies audit and certify only according to this standard.
- An important part of IATF 16949:

  Traceability of products and assignment of measuring equipment to product batches!

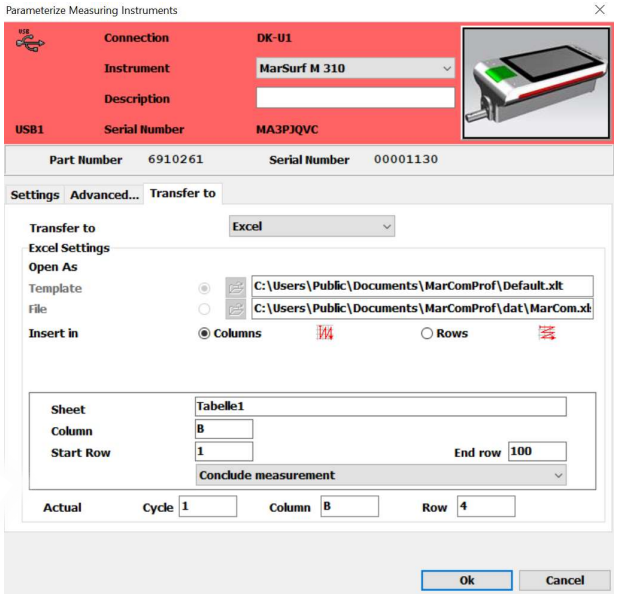
Documentation with Marcom software

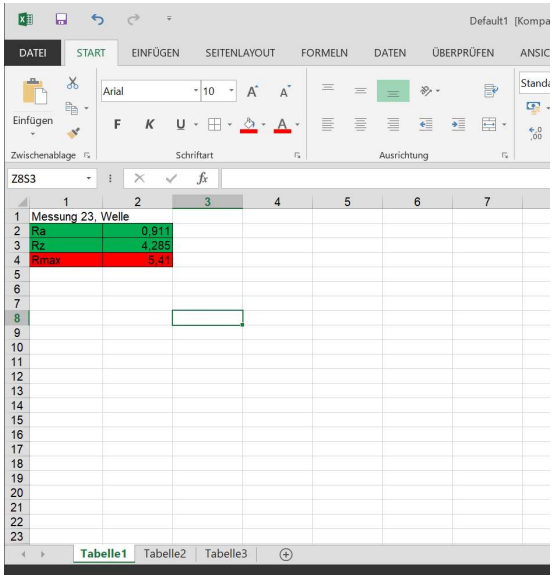
- IATF ready with traceability of the gauge ID
- Setting of tolerances via MarCom



Documentation with Marcom software

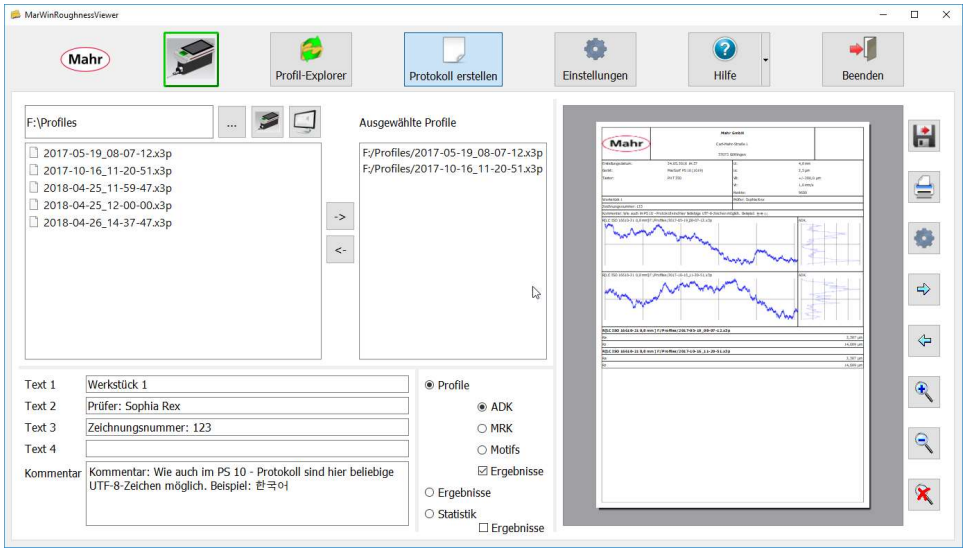
- Transfer of the measurement results to the MarCom software in e.g. an Excel table
- Remote start of the measurement via e.g. keyboard





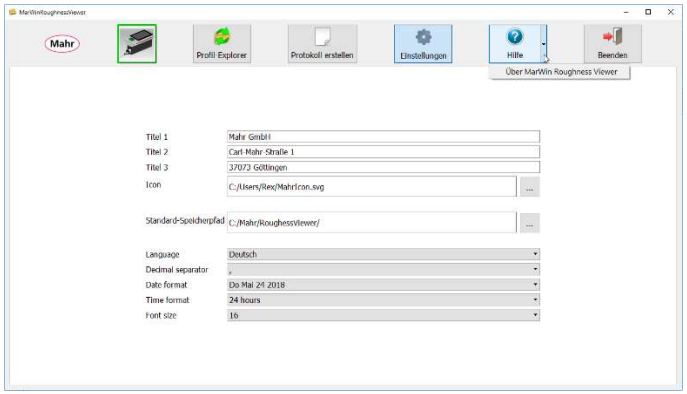
Documentation with Software MarWin Roughness Viewer

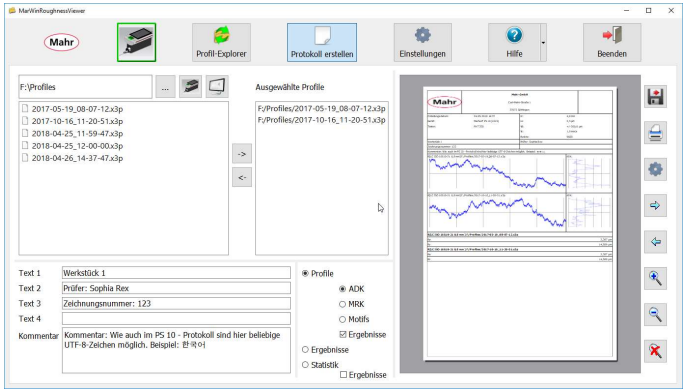
- The MarWin Roughness Viewer is a simple software for logging the collected measurement data.
- The evaluation (filtering and calculation of characteristic values) is performed in the MarSurf M 310.
- The MarWin Roughness Viewer is available for free download on the Mahr website.



Documentation with Software MarWin Roughness Viewer - Features

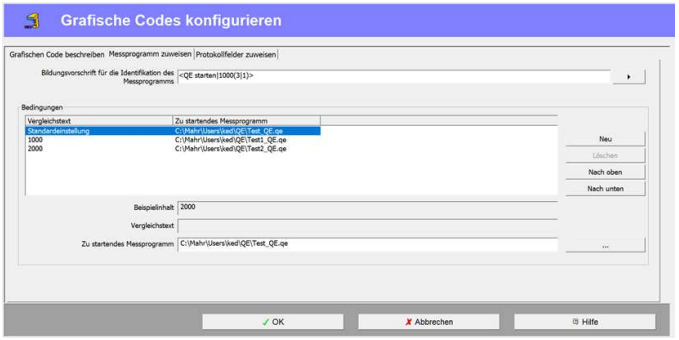
- Creation of protocols from up to 100 profile files
- Easy configuration of the protocols:
  - only profile display
  - Profile plus MRC
  - Profile plus ADC
  - Profile with marked motifs
  - Profile with results
  - Results (without profile display)
  - Statistics table (mean value, sigma, minimum, maximum, range, out of tolerance, not evaluable) without and with original value list
- Print protocol
- Save protocol as pdf file
- Edit profile information for the protocol



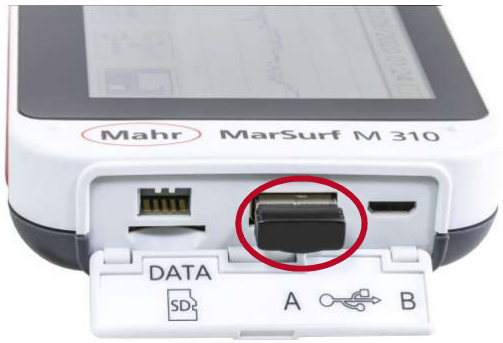


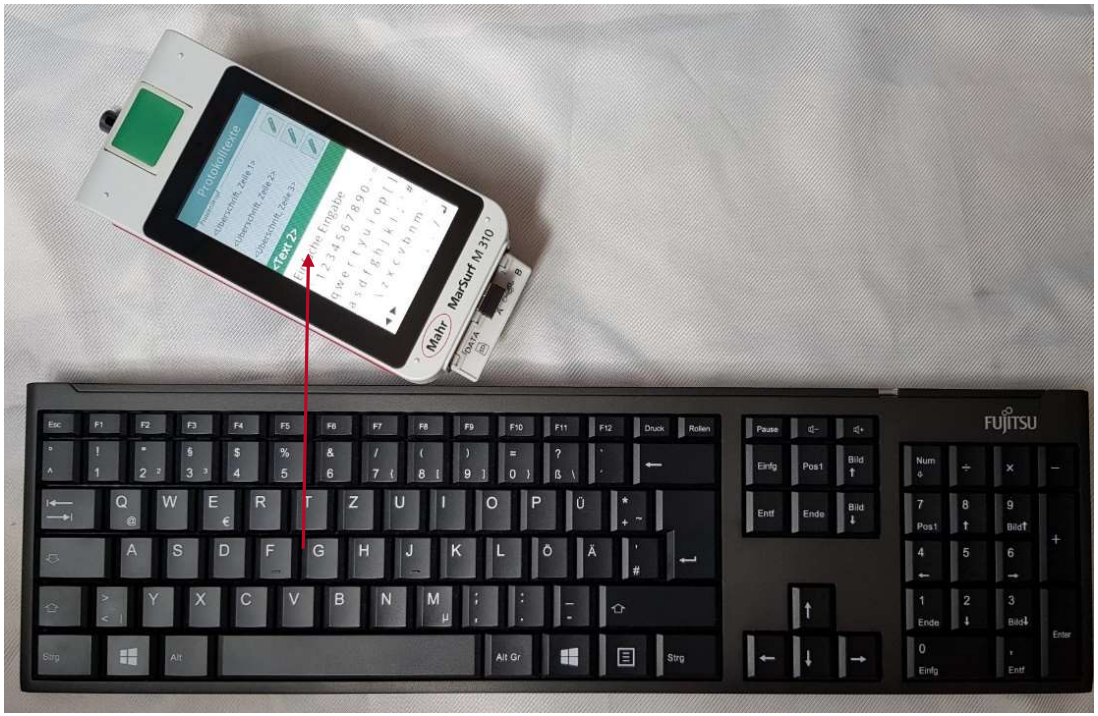
Outlook - Function QR-/Barcode Scanner

- The next software version of the MarWin Roughness Viewer will include the QR/Barcode Scanner function.
- The "QR/Barcode Scanner" function allows a standard USB/Bluetooth scanner to be connected to the MarSurf M 310 and is a convenient function for entries that would otherwise have to be made via alphanumeric input on the touch TFT.
- **Examples**: Scanning a QR/barcode on the workpiece to start the associated program, scanning a QR/barcode on the workpiece to read workpiece information (drawing no. etc.) into the profile information

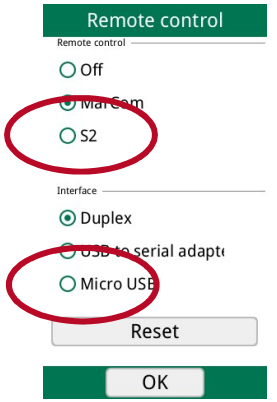


Connection USB keyboard for text input of the protocol texts of the PDF protocol





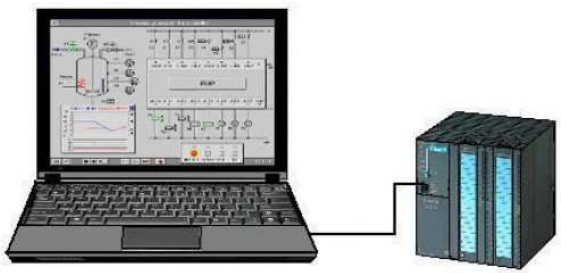
New serial interface - Remote control via Micro-USB interface

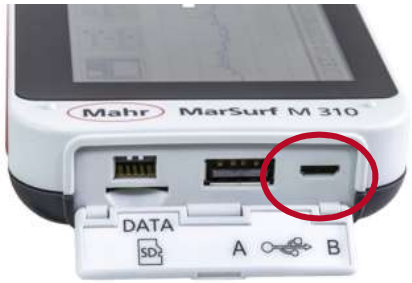


For remote control via ASCII commands, e.g. via statistical process control (SPC) software.

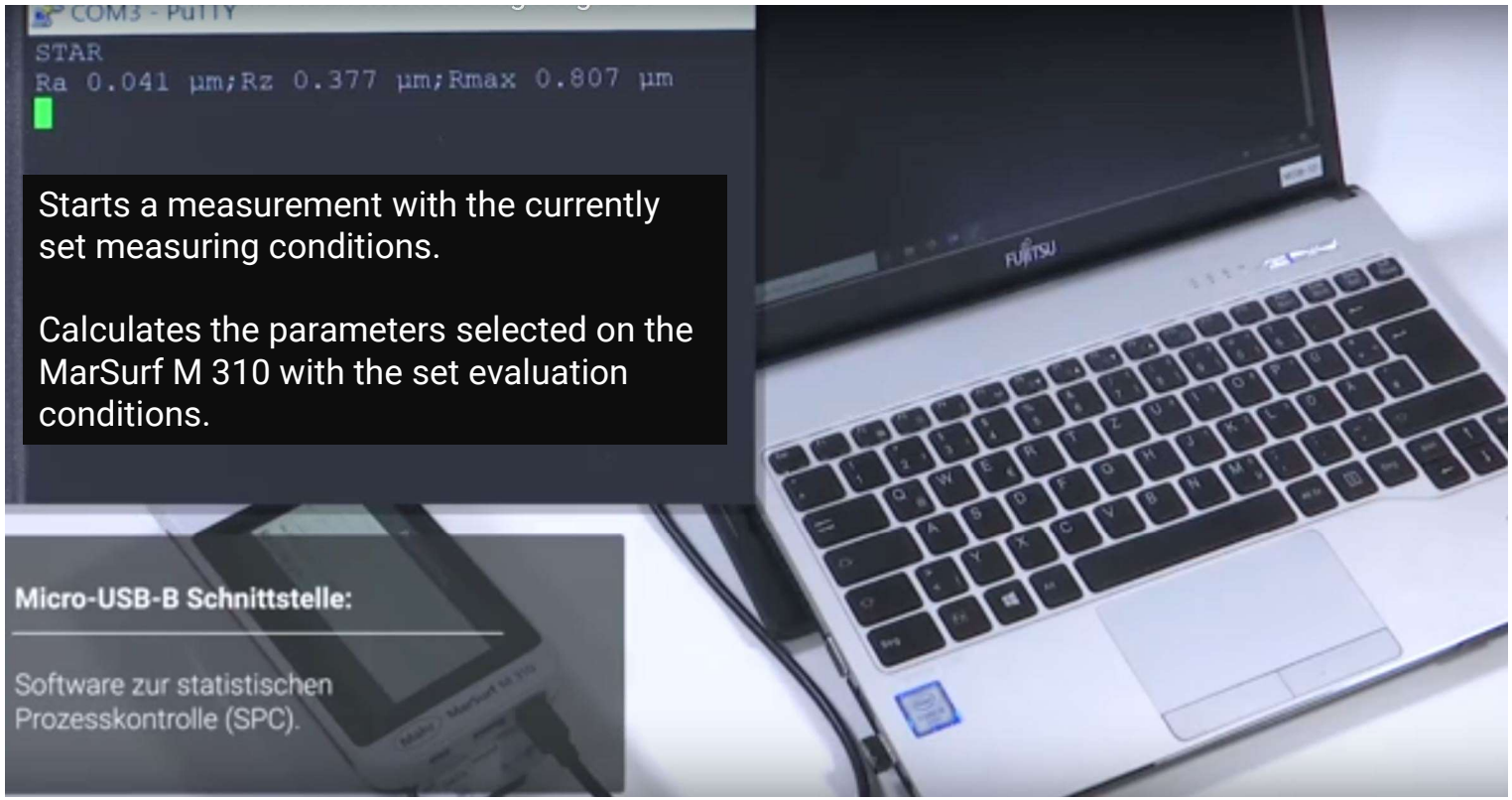
Start measurement

- Starts a measurement with the currently set measuring conditions.
- Calculates the parameters selected on the MarSurf M 310 with the set evaluation conditions.
- Transfers all calculated characteristic results in a string terminated with <CR>.

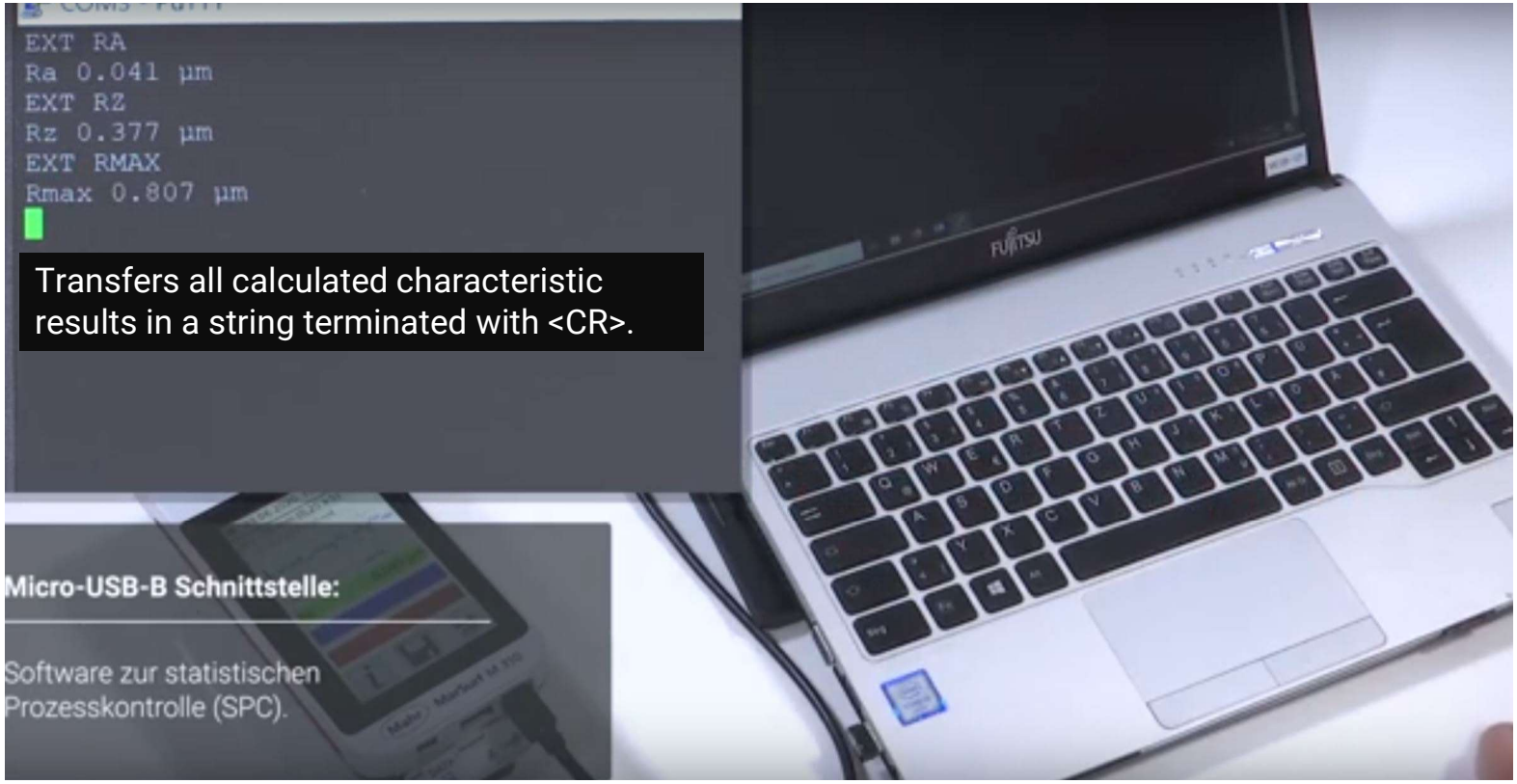




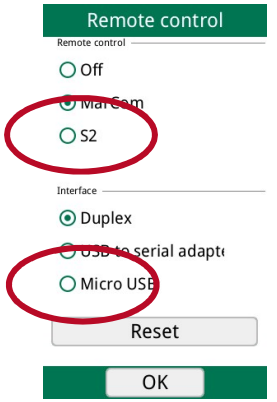
New serial interface - Remote control via Micro-USB interface



New serial interface - Remote control via Micro-USB interface



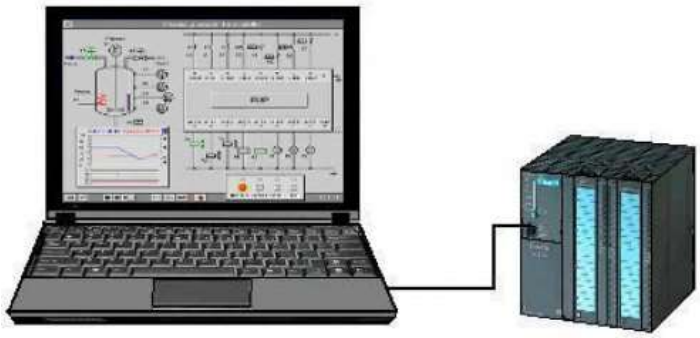
New serial interface - Remote control via Micro-USB interface

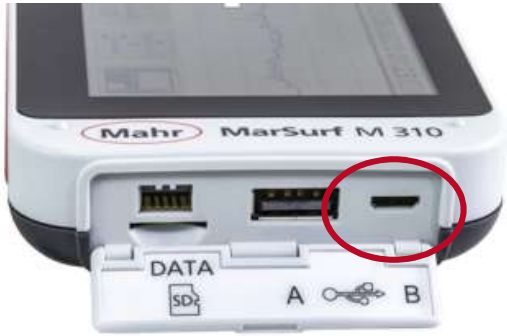


For remote control via ASCII commands, e.g. via statistical process control (SPC) software.

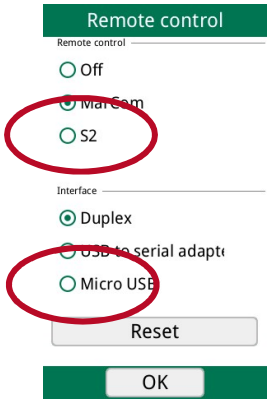
Changing settings on the MarSurf M 310

- Loads the Quick&Easy with the file name "Name" and confirms the error-free execution with "ready
- Change the tracing length, Cutoff, unit of measurement





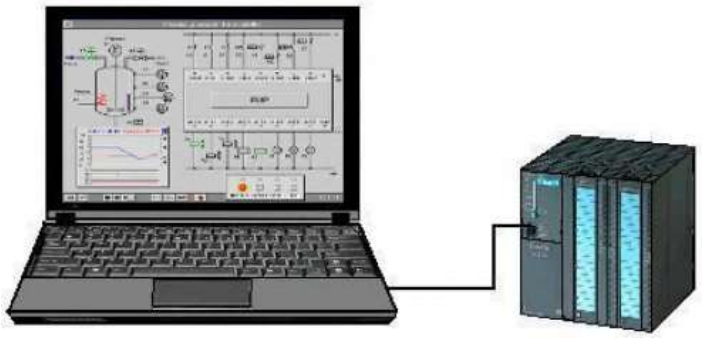
New serial interface - Remote control via Micro-USB interface

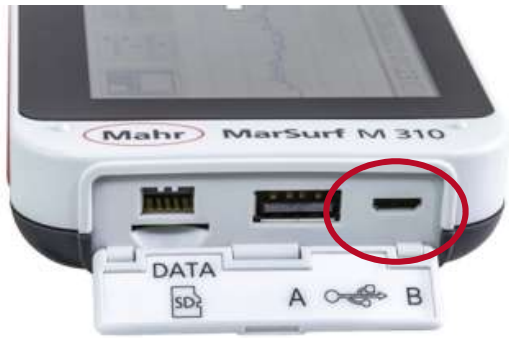


For remote control via ASCII commands, e.g. via statistical process control (SPC) software.

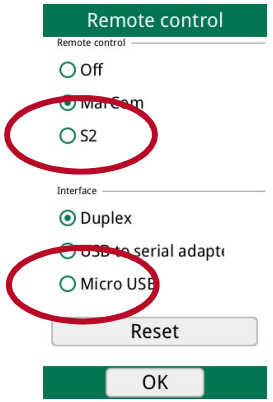
Request settings/data from the MarSurf M 310

- Queries the article and serial number (**IATF ready!)**
- Queries: the result, the current tracing length, the current number of individual measuring ranges, the current cutoff, the current unit of measurement, the current probe tip position





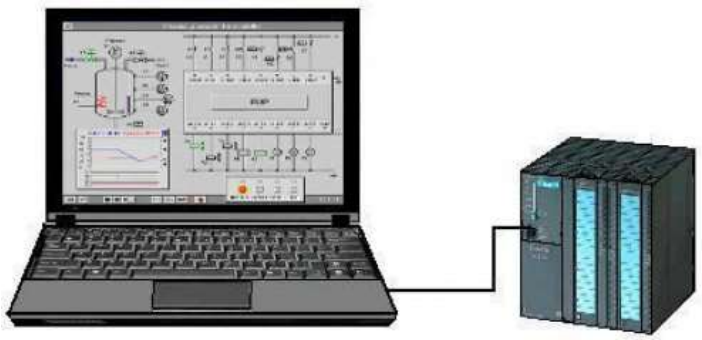
New serial interface - Remote control via Micro-USB interface

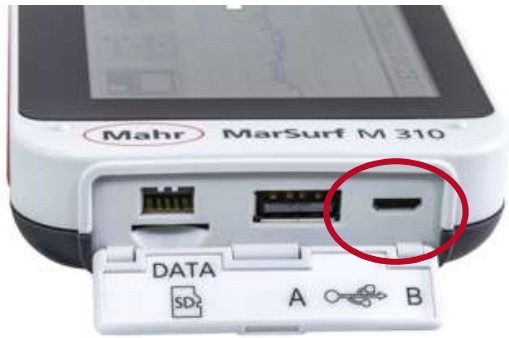


For remote control via ASCII commands, e.g. via statistical process control (SPC) software.

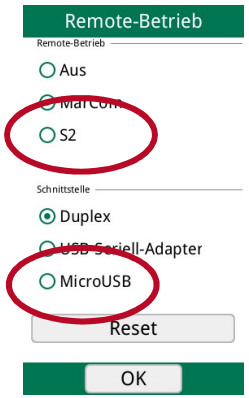
Confirmation and error message of the MarSurf M 310

- Faultlessly executed commands are acknowledged by the MarSurf M 310.
- Error messages → If commands are executed incorrectly, the MarSurf M 310 sends an error message.





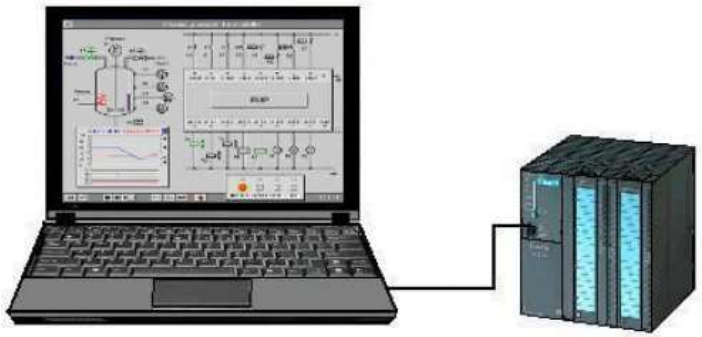
New serial interface - Remote control via Micro-USB interface



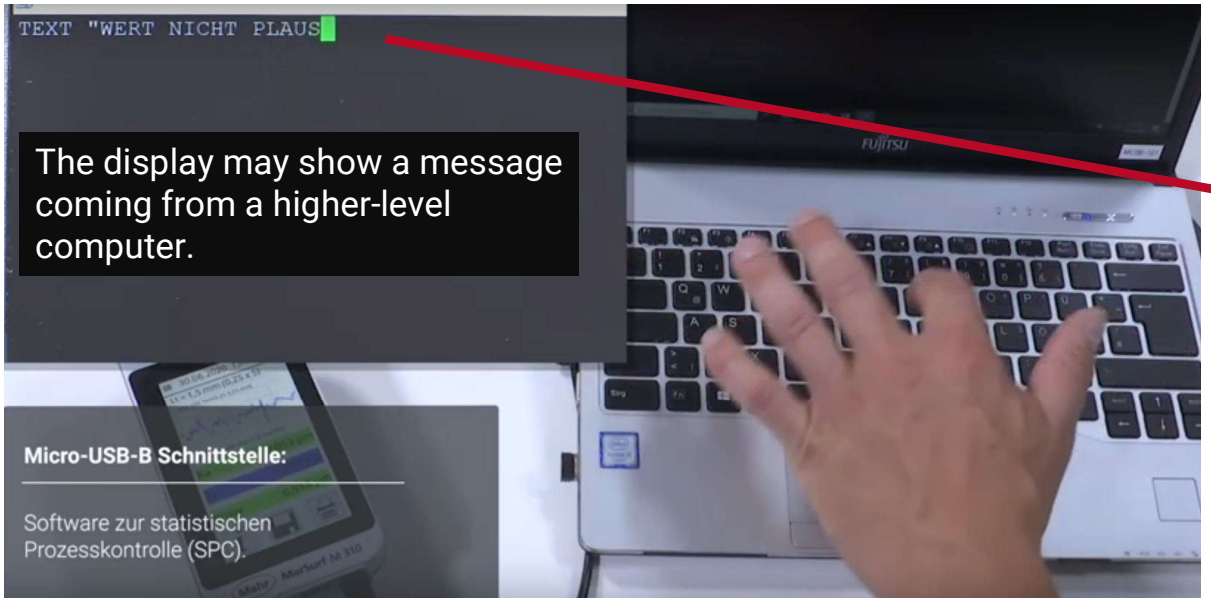
For remote control via ASCII commands, e.g. via statistical process control (SPC) software.

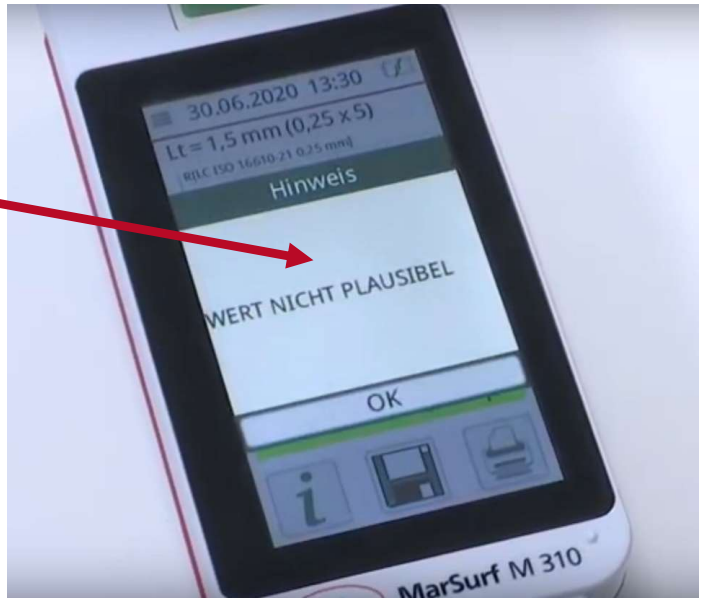
Text message on the display of MarSurf M 310

- The display may show a message coming from a higher-level computer.



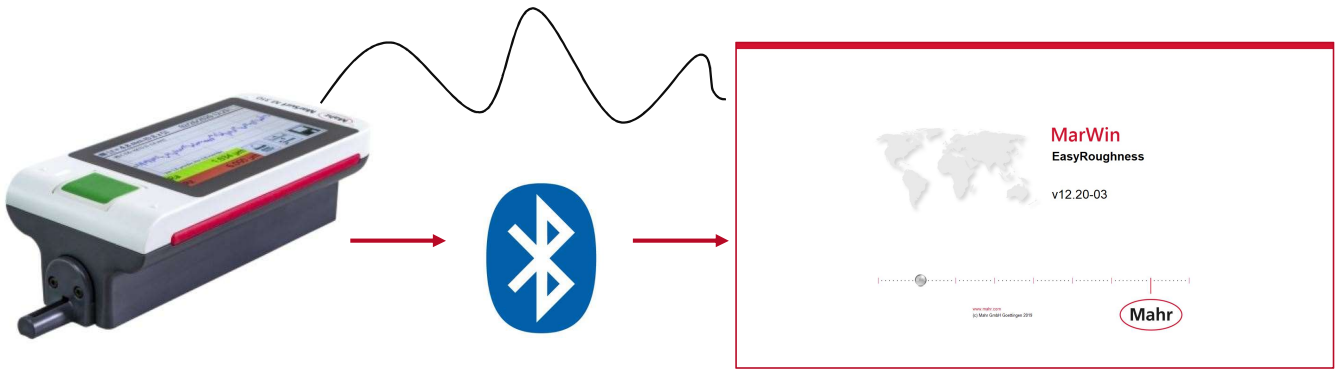
New serial interface - Remote control via Micro-USB interface

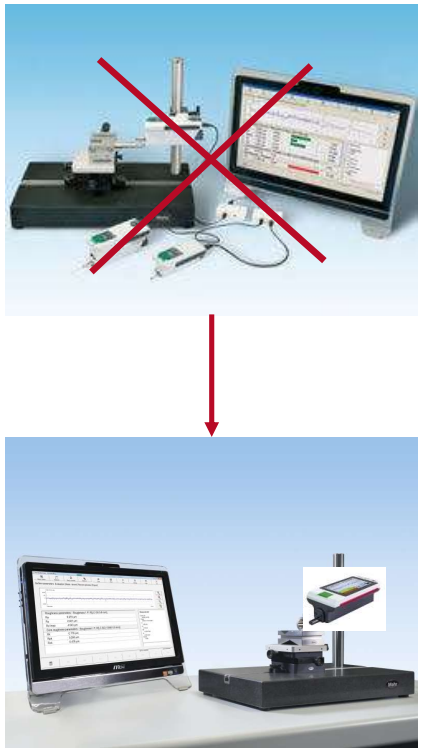




Outlook - MarSurf M 310 as feed device for MarWin Easy Roughness software

- The next software version of the MarSurf M 310 will integrate the connection to MarWin Easy Roughness
- MarSurf M 310 as feed device to MarWin Easy Roughness software
- Direct connection to the PC (without MidRange, MI 500 Box) via cable or Bluetooth adapter





Application example

MarSurf M 310 with magnetic tripod 815 MA/MB

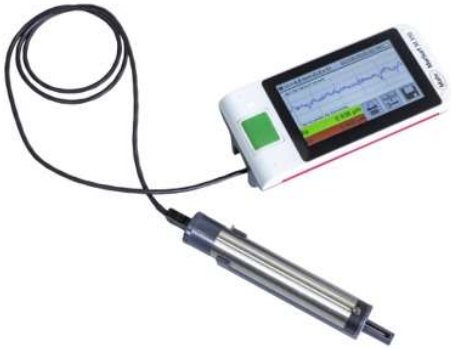
MarSurf M 310 with ST-D measuring stand and manual prism holder

Application example

MarSurf M 310 on the measuring stand ST-D

MarSurf M 310 with hand prism and height adjustment

Application example



Flexible hand prism

Application example

Special solution with MarSurf M 310

Application example

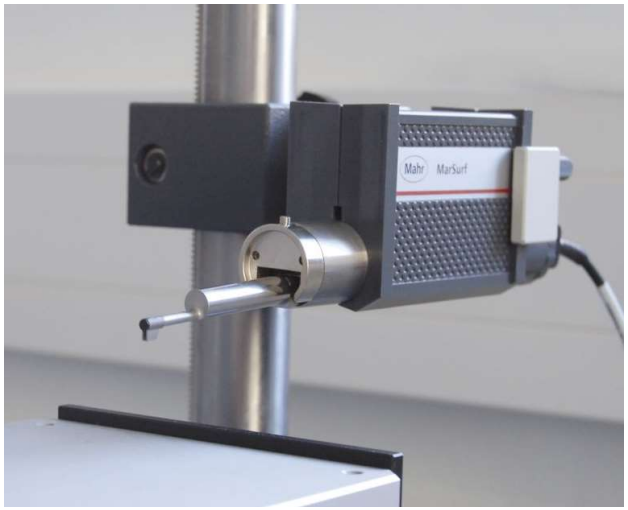
Roughness measurement in production

Application example

Company AGCO Fendt, Marktoberdorf

MarSurf M 310 C2 for transverse scanning

The MarSurf M 310 C2 is specially designed for measurements in transverse direction (e.g. on crankshafts or camshafts and at bearing points).



Accessories pick-up

- Pick-up extension 80 mm (3.15 in)

- Pick-up PHT-3-350 for measurements in bores from Ø 3 mm (0.12 in)

- Pick-up PHT 11-100 for measurements at recessed points e.g. in grooves from 2.5 mm (0.10 in) wide and up to 7.5 mm (0.30 in) deep

- Pick-up PHTR 100 for measurements on concave and convex surfaces

- Pick-up PHTF 0.5-100 for measurements on tooth flanks

- Pick-up PT 150 dual-skid pick-up for measurements on metal sheet and roller surfaces according to DIN EN 10049 (SEP)

Accessories

- RD 18 C mount with dia. 8H7

- Mount for measuring stand ST-D / ST-G

- Measuring stand with magnetic base MarStand 815 MA/MB

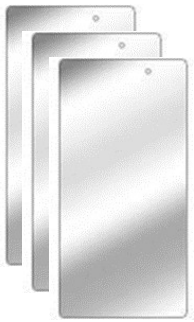
- Pick-up protection/ pick-up protection with prism

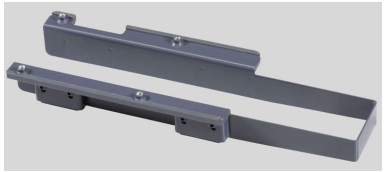
- Measuring stand ST-D, ST-F, ST-G

- Geometric standard PGN 3

Accessories

- Data connection cable USB Bi-Directional DK-U1 for connection to MarCom software
- PS 10 / M 310 test and geometry standard incl. DAkkS / DKD calibration certificate (ISO 5436-1, C3)
- Magnetic holder for MarSurf M 310
- Display protection films (real glass) for MarSurf PS 10 / M 310





Scope of delivery MarSurf M 310 Set

6910260	**Set "MarSurf M 310 (2 µm)"**
6910261	Roughness measuring instrument MarSurf M 310
7028530	Probe protection with prismatic bottom, plastic, for measurements on cylindrical workpieces
6910434	hand prism
6850720	Height adjustable feet (2 pieces) for hand prism 6910434
3028331	Power supply unit (100 V AC to 264 V AC, 5 V =)
3028332	Mains adapter (4 pieces) for plug-in power supply unit 3028331 (for use in Europe, Great Britain, USA, Australia)
3028323	USB cable (USB-A, microUSB), length 2.0 m; to connect the power supply unit; to connect to the USB interface of a computer
7053553	Extension cable for removable drive unit, length 1.2 m
3650419	Hexagon screwdriver, SW 2.0 mm
3762817	Folding map "MarSurf. Surface parameters" (German, English)
7053543	Carrying case with shoulder strap
7012054	Transport case

Scope of delivery MarSurf M 310 Set

6910267	**Set "MarSurf M 310 (2 µm) with printer"**
6910261	Roughness measuring instrument MarSurf M 310
7028530	Probe protection with prismatic bottom, plastic, for measurements on cylindrical workpieces
6910434	hand prism
6850720	Height adjustable feet (2 pieces) for hand prism 6910434
6910270	*Bluetooth* printer (receipt printer, 58 mm) with charging station
5450105	Thermal paper (1 roll)
3003856	USB-*Bluetooth*-Adapter
3028331	Power supply unit (100 V AC to 264 V AC, 5 V =)
3028332	Mains adapter (4 pieces) for plug-in power supply unit 3028331 (for use in Europe, Great Britain, USA, Australia)
3028323	USB cable (USB-A, microUSB), length 2.0 m; to connect the power supply unit; to connect to the USB interface of a computer
7053553	Extension cable for removable drive unit, length 1.2 m
3650419	Hexagon screwdriver, SW 2.0 mm
3762817	Folding map "MarSurf. Surface parameters" (German, English)
7053543	Carrying case with shoulder strap
7012054	Transport case

Available MarSurf M 310 Set

6910260	Set "MarSurf M 310 (2 µm)"
6910265	Set "MarSurf M 310 (5 µm)"
6910267	Set "MarSurf M 310 (2 µm) with printer"
6910268	Set "MarSurf M 310 (5 µm) with printer"
6910266	Set "MarSurf M 310 without PHT-probe"
6910264	Set "MarSurf M 310 C2 (2 µm)"
6910271	Bluetooth-/USB printer with charging station

Technical data

Unit of measurement	Metric, inch
Measuring principle	Stylus method
Pick-up	Inductive skidded pick-up, 2 µm (80 µin), 90° stylus tip, measuring force approx. 0.7 mN
Measuring range / resolution	350 µm / 8 nm
Display	Large illuminated 4.3“-TFT-Touchdisplay; display rotatable
Parameter	Ra, Rq, Rz (Ry (JIS) corresp. Rz), Rz (JIS), Rmax, Rp, RpA (ASME), Rpm (ASME), Rpk, Rk, Rvk, Mr1, Mr2, A1, A2, Vo, Rt, R3z, RPc, Rmr (tp (JIS, ASME) corresp. Rmr), RSm, RSk, RS, CR, CF, CL, R, Ar, Rx
Filter acc. to DIN ISO/JIS	Phase-correct profile filter (Gaussian filter) acc. To DIN EN ISO 16610-21 (before DIN EN ISO 11562), special filter acc. to DIN EN ISO 13565-1, ls-filter acc. to DIN EN ISO 3274 (disengageable)
Standards	DIN EN ISO, ASME, JIS
Cutoff λc (acc. to ISO/JIS):	0.25 mm, 0.8 mm, 2.5 mm, automatically
Pre- and post-travel:	half, without
Tracing length *Lt* (according to ISO/JIS)	1.5 mm, 4.8 mm, 15.0 mm, N x Lc, freely selectable, automatically
Tracing length (according to MOTIF)	1 mm, 4 mm, 8 mm, 12 mm, 16 mm
Evaluation length *lm* (according to ISO/JIS)	1.25 mm, 4.0 mm, 12.5 mm
Number n of sampling lengths acc. to ISO/JIS	Selectable: 1 to 16
Short cutoff acc. to ISO/JIS	Selectable, freely adjustable
Tracing speed	1 mm/s, 0.5 mm/s

Technical data

Return speed	1 mm/s
Calibration function	Dynamic, Ra, Rz and RSm (calibration standard integrated, removable)
Languages	17, including 3 Asian languages German, English, French, Italian, Spanish, Portuguese, Dutch, Swedish, Russian, Polish, Czech, Japanese, Chinese, Korean, Hungary, Turkey, Romanian
Memory capacity	TXT, X3P, CSV, PDF-file, memory can be extend with microSD-Card (up to 32 GB) Results as txt-file: min. 500.000 PDF-protocol: min. 1500 Profile in X3P: min. 3900 Profile as txt-file: min. 1200 with 32 GB microSD-Card → Factor 320
Other	Drive unit removable, Blocking of settings (code-protected), date/time, tolerance monitoring in terms of color, Connection to MarCom software via cable (USB, RS232C) and wireless data transmission, Connection to MarCom software via data connection cable (duplex - USB), connection to SPC, connection to Bluetooth printer, storage of measuring programs
Dimensions	160 mm x 77 mm x 50 mm
Weight	approx. 500 g
Battery	Li-ion battery
Battery charging time	Approx. 1,5 hours
Interfaces / power supply	USB, MarConnect (USB, RS232), microSD-Card slot for SD / SDHC / 100 – 264 V
Protection class	IP 40

- Thank you very much for your attention!