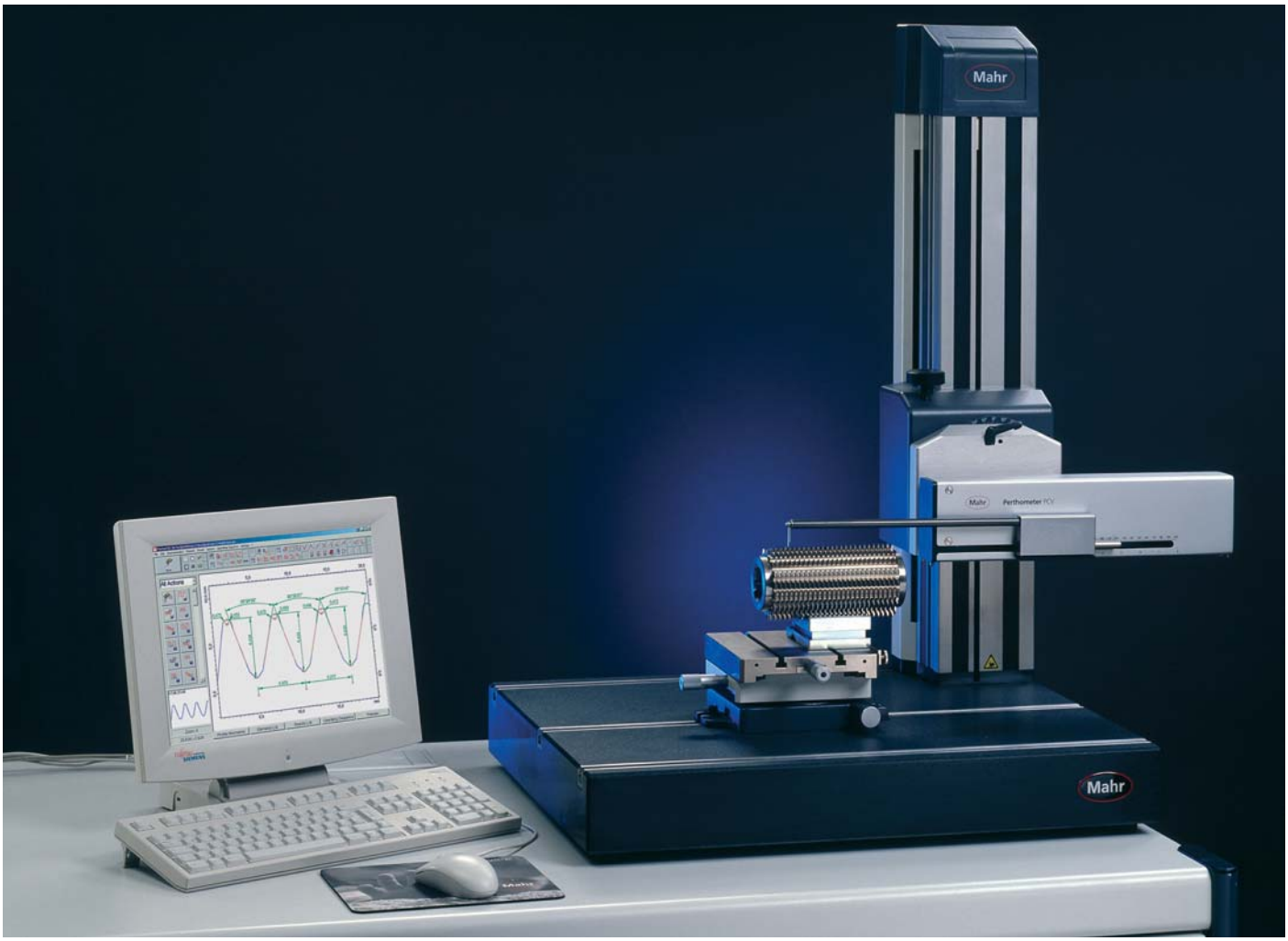
MarSurf



The new generation of contour measurement systems

MarSurf XC 20

MarSurf XC 2

- 0 +

Mahr

EXACTLY

MarSurf XC 20 / XC 2
The new generation of contour measurement systems

Ladies and Gentlemen,

There is an increasing need in industrial production metrology for fast, simple measurement of workpiece profiles.

The measuring tasks are many and varied and require ever greater precision and optimum measuring strategies for the entire system.

Today, we're pleased to be able to introduce the MarSurf XC 20 / MarSurf XC 2 contour measurement and evaluation system. Decades of experience in contour metrology and valuable feedback from our customers have shaped this latest generation of instruments.

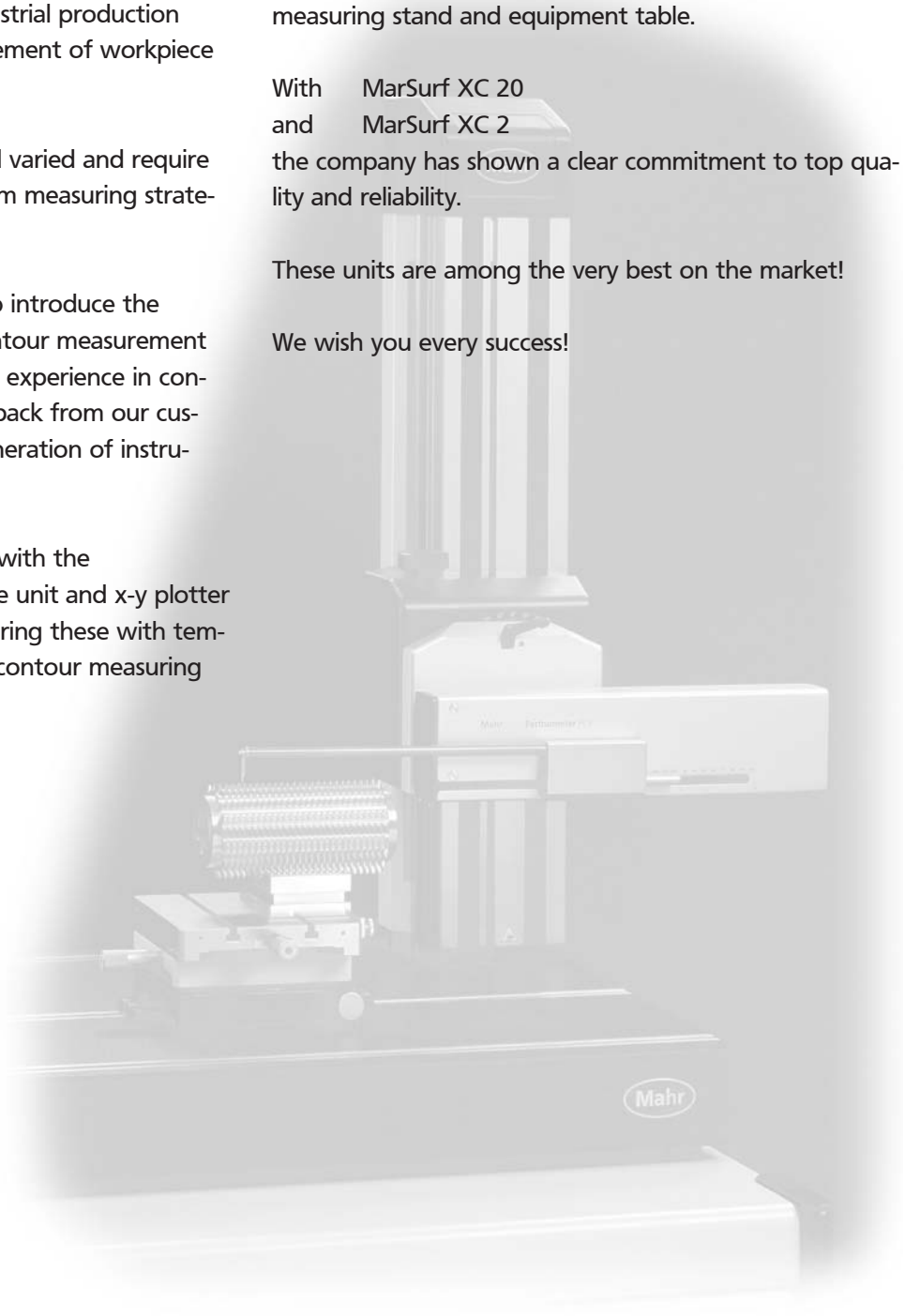
What began around 30 years ago with the Conturograph, consisting of a drive unit and x-y plotter for recording contours and comparing these with templates, has since developed into a contour measuring system of the very highest quality.

This is true of the entire measuring station, consisting of: Measurement and evaluation system, drive unit, pick-up, measuring stand and equipment table.

With MarSurf XC 20
and MarSurf XC 2
the company has shown a clear commitment to top quality and reliability.

These units are among the very best on the market!

We wish you every success!



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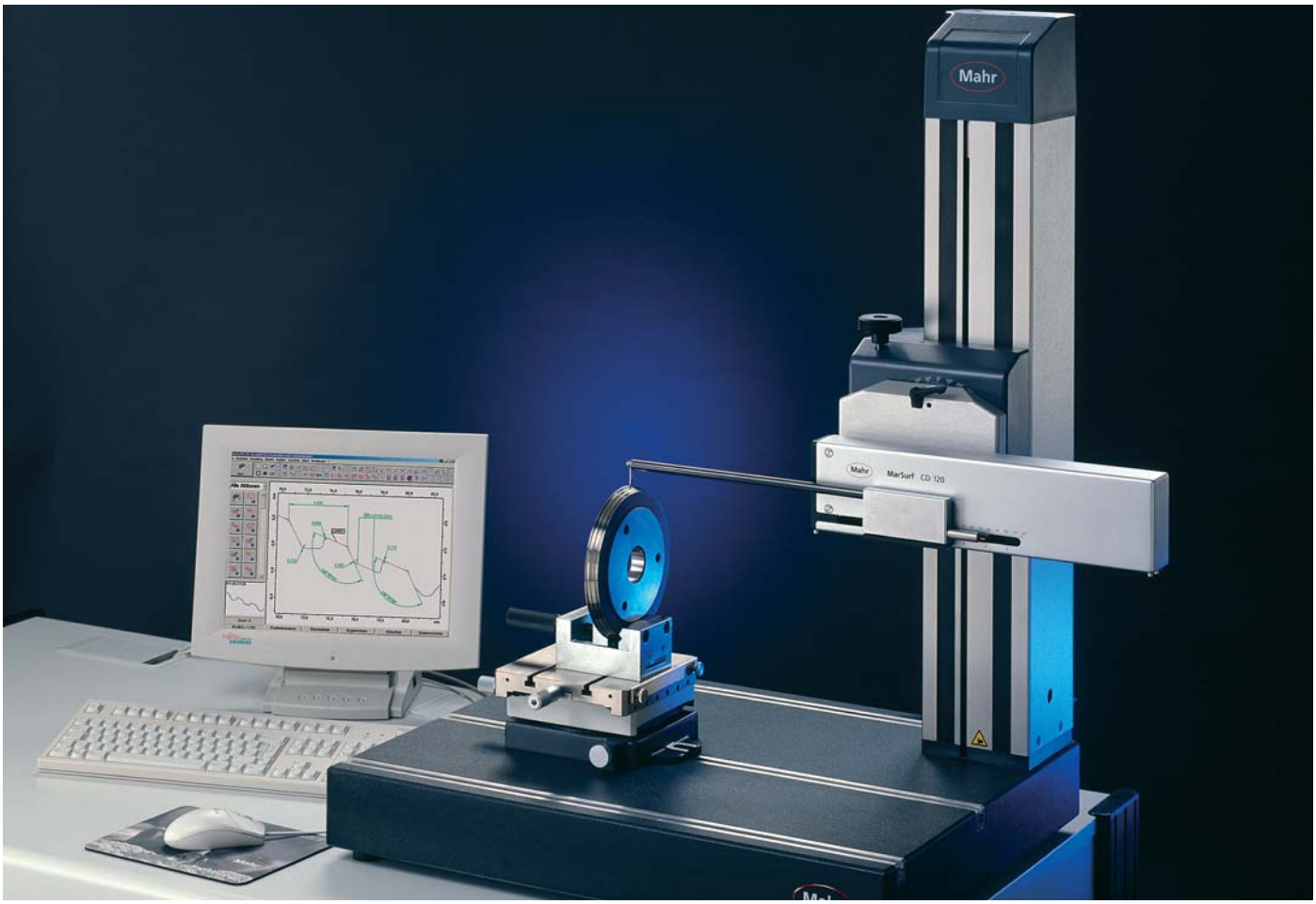
MarSurf XC 20 / XC 2

The contour metrology



Measuring and evaluating geometries of workpieces and tools that are relevant for correct functioning is one of the primary requirements of research, technology and industry. Time and again, the tried-and-tested contour measurement system has shown itself to be the system of choice over all other procedures, since it is faster, easier to use, more cost-effective and delivers greater performance.

A measured profile can quickly and easily be turned into an accurate and reliable evaluation result at a time when accuracy and evaluation criteria are becoming increasingly important on the market.

Features such as

- creating regression straight lines and circles
- creating points, intersection points, free points, center points, maximum and minimum points
- creating coordinate systems
- determining radii, distances, angles, coordinates and line form deviations
- performing nominal/actual comparisons
- monitoring tolerances
- importing profile data, e.g. DXF files
- automatic program runs

are just a few examples of the many functions supported by MarSurf XC 20 / XC 2.

The key features of MarSurf XC 20 / XC 2 include not just the software, the mechanical components, the measuring characteristics of the drive units and pick-ups or the measuring station components such as the measuring stand, mounts, etc.,
they also include the excellent configuration achieved by ensuring the perfect interplay of all components to devise the optimum solution for your needs.

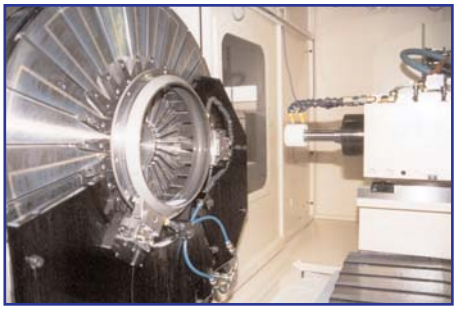
The MarSurf measuring stations combine outstanding instruments with patented ideas.

MarSurf XC 20 / XC 2

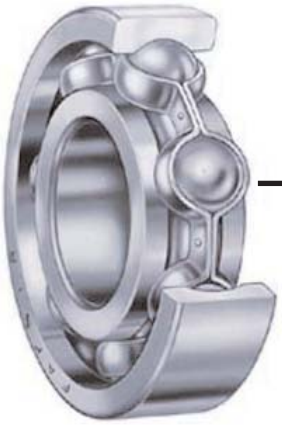
The process flow

The simple, faster, more dependable way

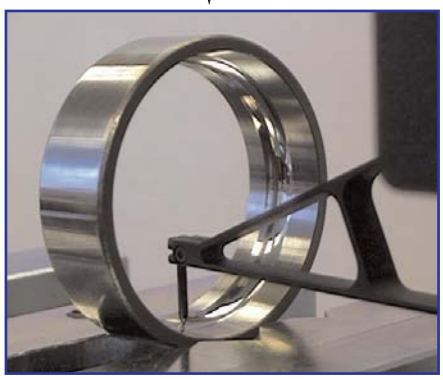
From workpiece to measurement and final result:

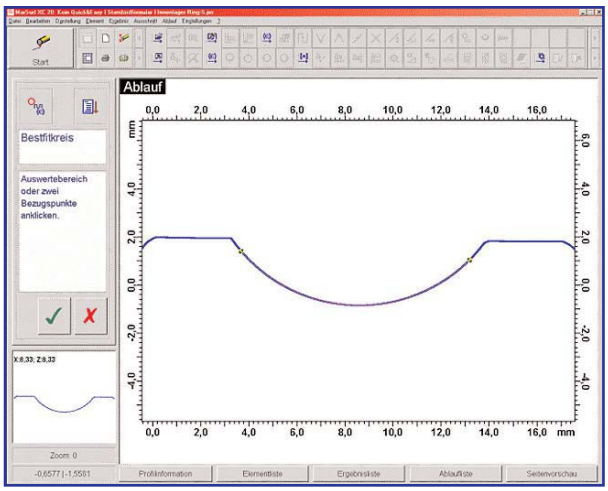


Processing machine

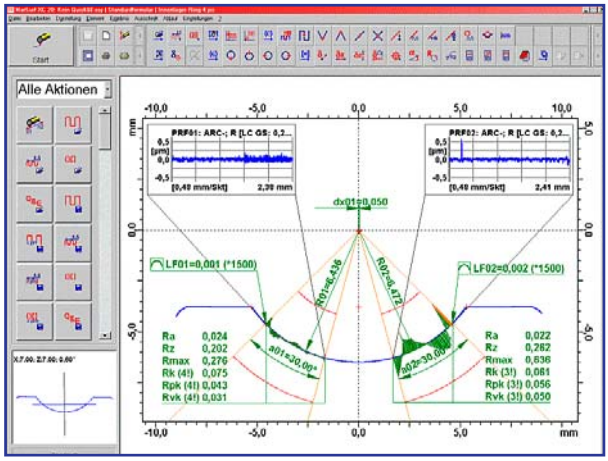


Workpiece





Measurement



Result

MarSurf XC 20 / XC 2

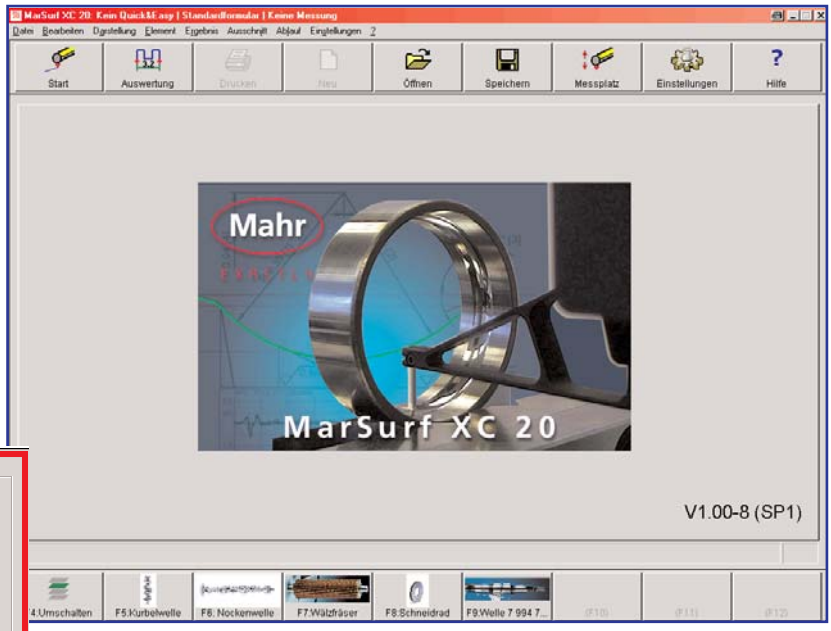
The simple, reliable gateway to the XC 20 / XC 2 world

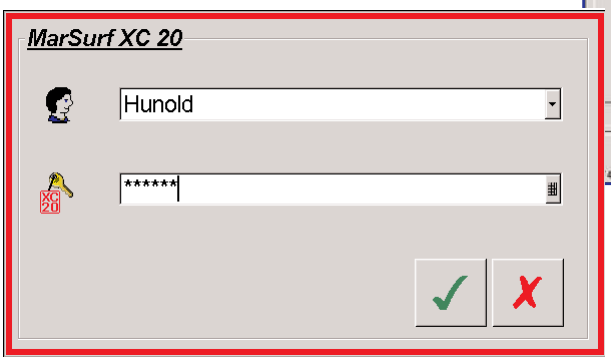
Password-protected user login

You can define which operator is to have which rights on the instrument

For example

- Administrator
- Only start programs via function keys

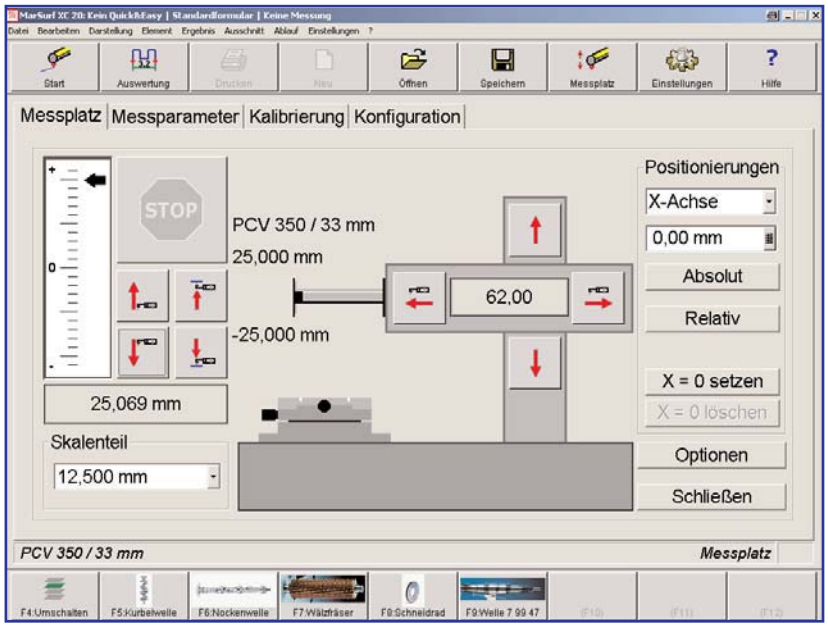




The easy way to fast measurement

The start

- All axes of measuring stand, drive unit and pick-up can be controlled directly
- Functions such as start to end point measurement (with operator prompting via text tips) enable the user to perform correct measurements in interactive mode with practically no setup time

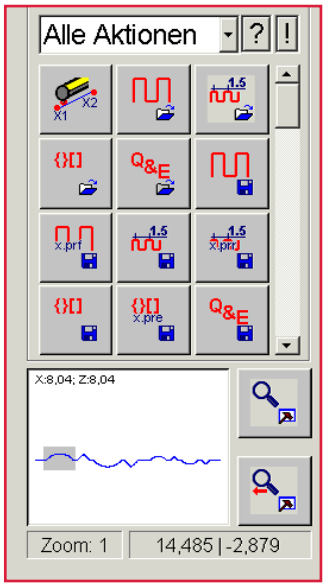


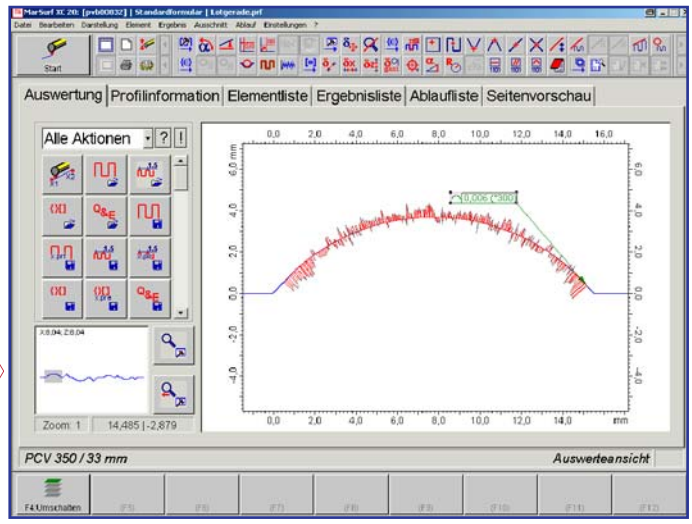
MarSurf XC 20 / XC 2

The evaluation

Logically structured icons speak all languages and need no translation!

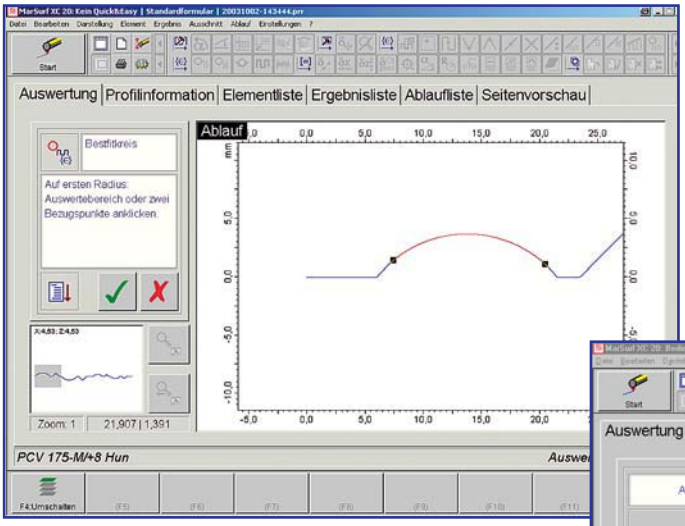
Additionally, former Perthometer Concept users can select display of the familiar Perthometer Concept icons!



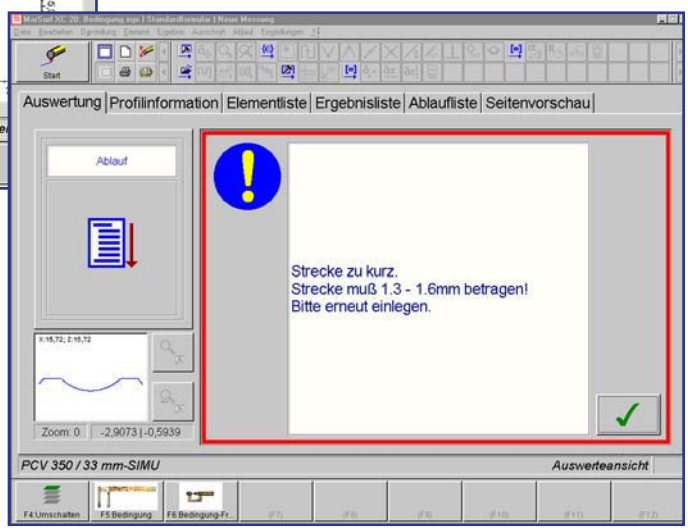


Use of the Quick & Easy function:
Setting up and saving an automatic program run without programming knowledge, "learning by doing".

Category icons



Plausibility check for automatic program runs (XC 20 only)



Operating sequence list with program optimization

- Jumps, loops
- Interactive user intervention in the case of automatic evaluation

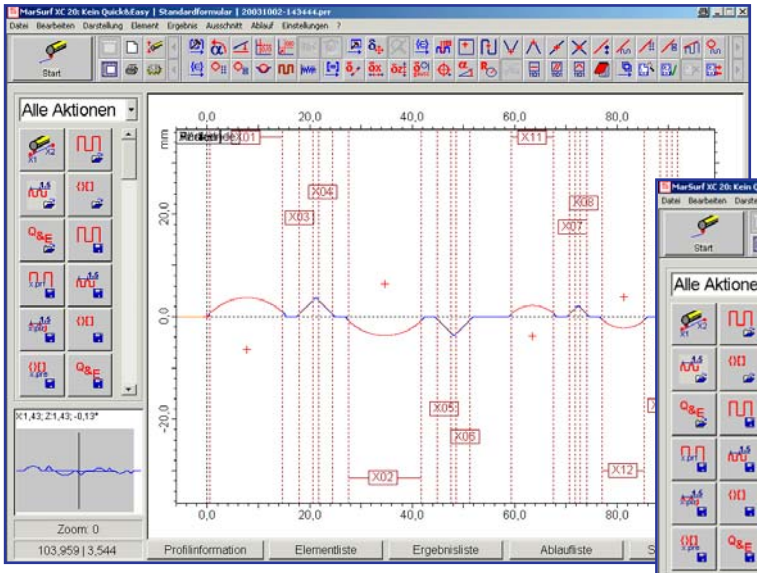
MarSurf XC 20 / XC 2

The evaluation

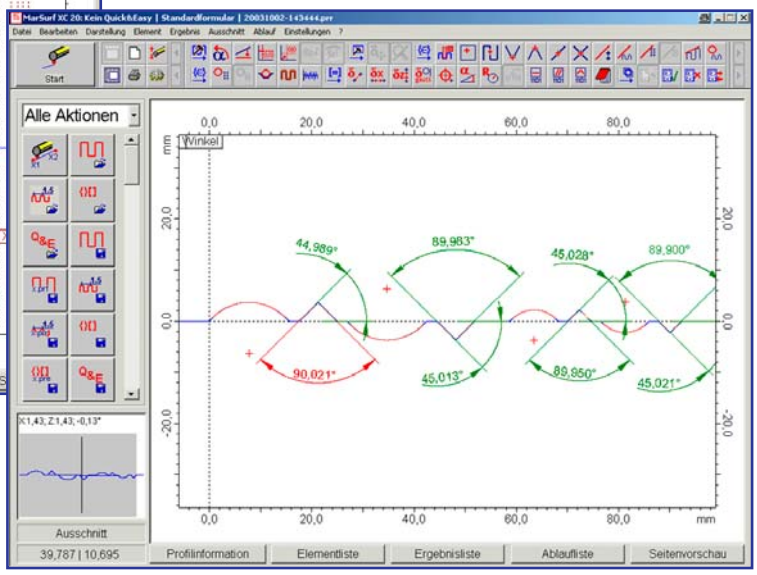
Sections

- Details can be shown separately

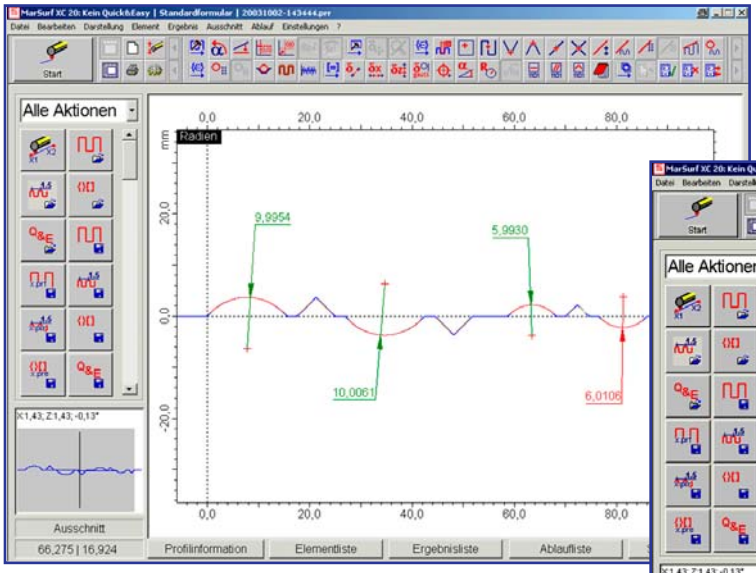
Examples:



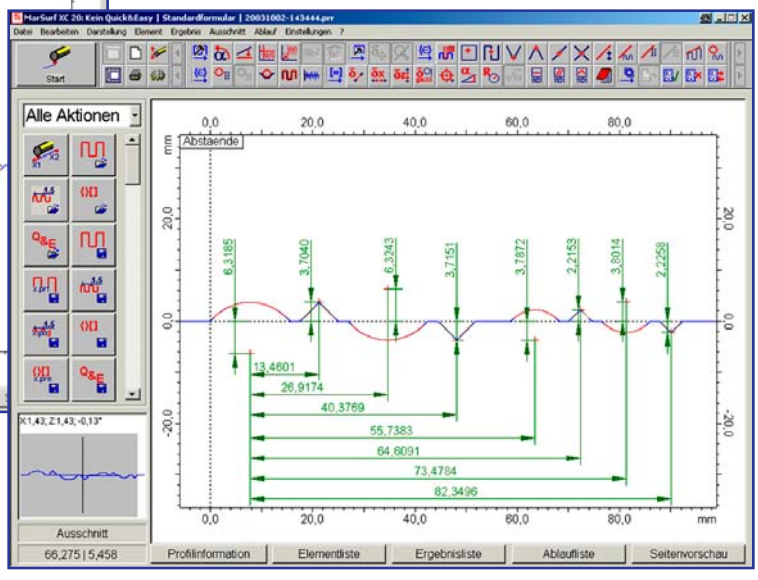
By creating sections, individual results groups can be made error-free.



Angles



Radii

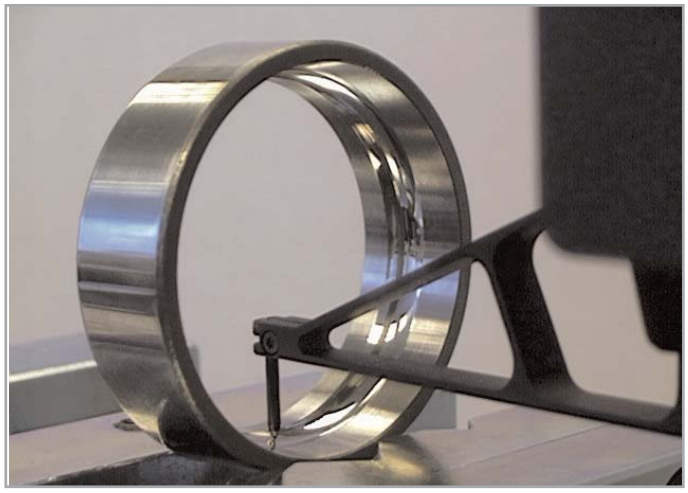


Distances

The evaluation

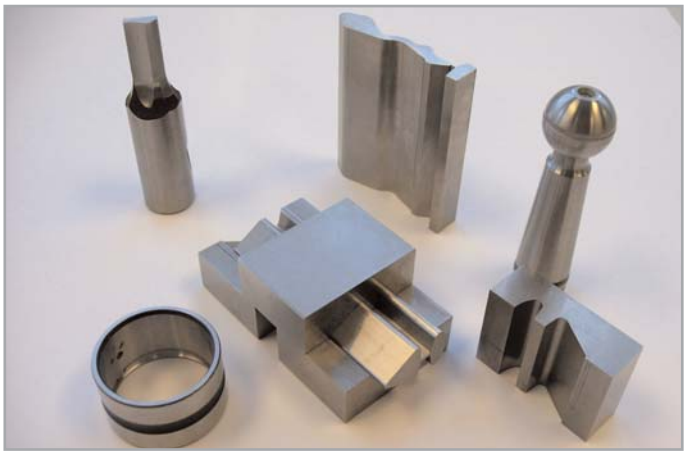
Sample applications

Thread tapper

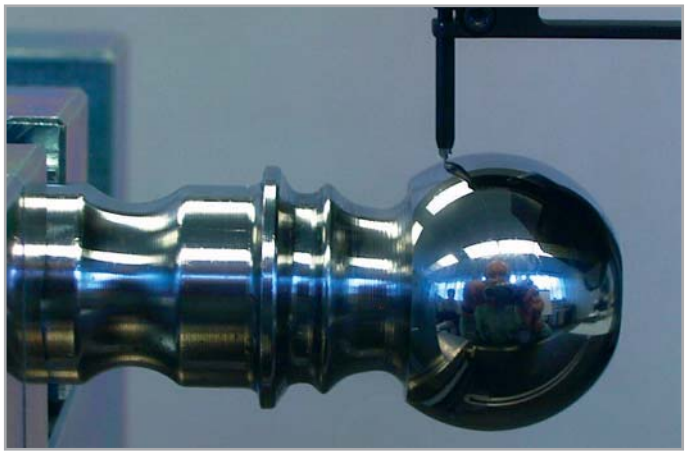


Ball bearing

Synchronous ring



Tool die, ball bearing, ball pin



Ball pin

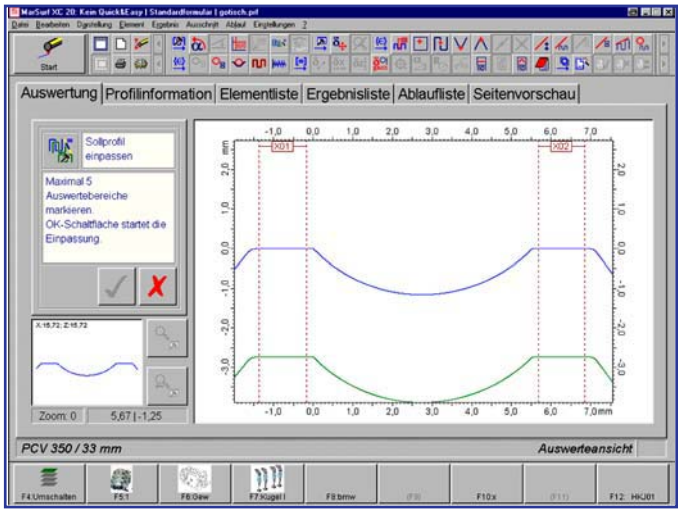
Wheel rim

MarSurf XC 20 / XC 2

The evaluation

Nominal / actual comparison

Up to five evaluation ranges can be selected
In many cases, profile comparisons are also performed with workpieces that are subject to heavy wear. The ability to select certain evaluation ranges offers the distinct advantage of being able to determine the fit-in ranges that are not subject to wear or deformation. This can be useful for optimum profile matching.



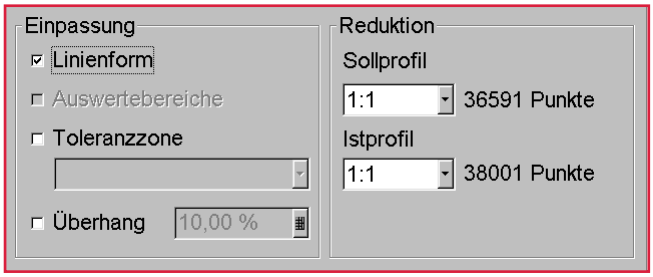
Example: Fit-in by selecting ranges

Methods for performing fit-in

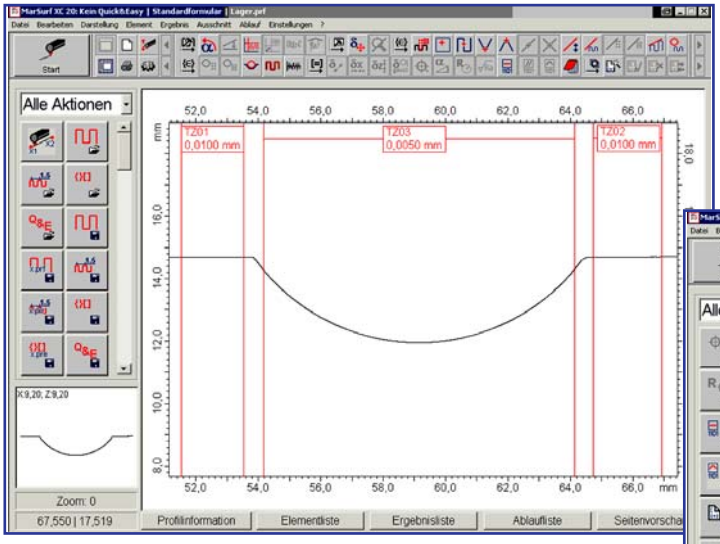
- Minimum line form deviation
- Least squares (Best Fit)

Generating the nominal profile

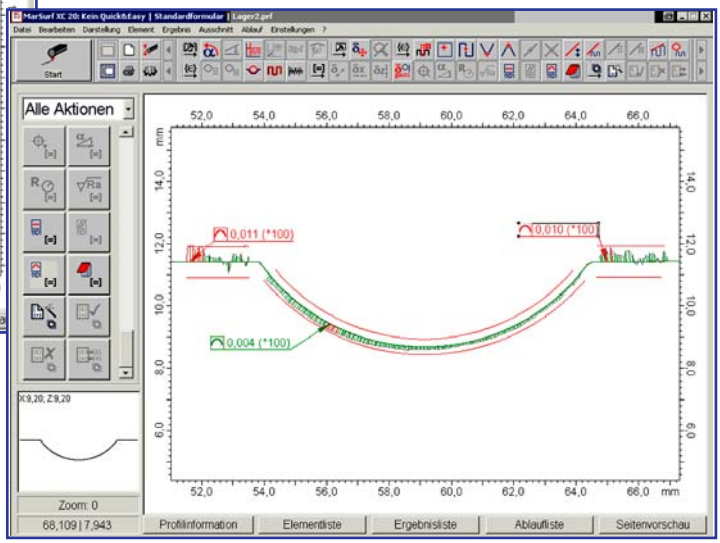
- Using master profile measurement,
- DXF import or
- Entering nominal geometries



Tolerances zones can be selected in any areas in the nominal profile (XC 20 only)



Nominal profile with tolerances zones

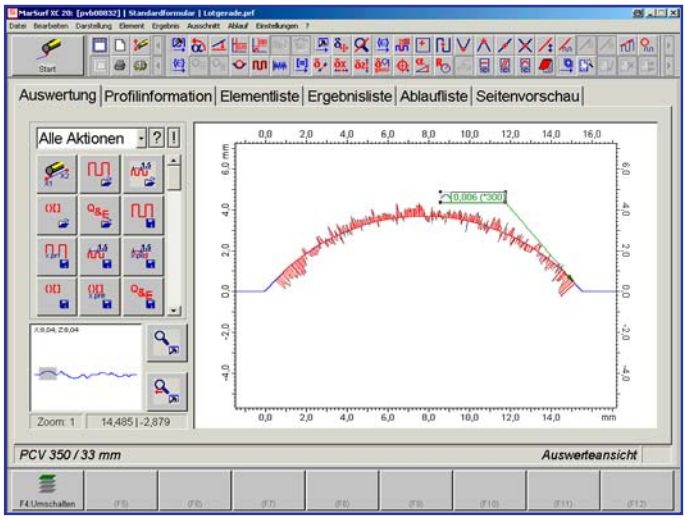


Nominal profile with tolerances zones fitted in

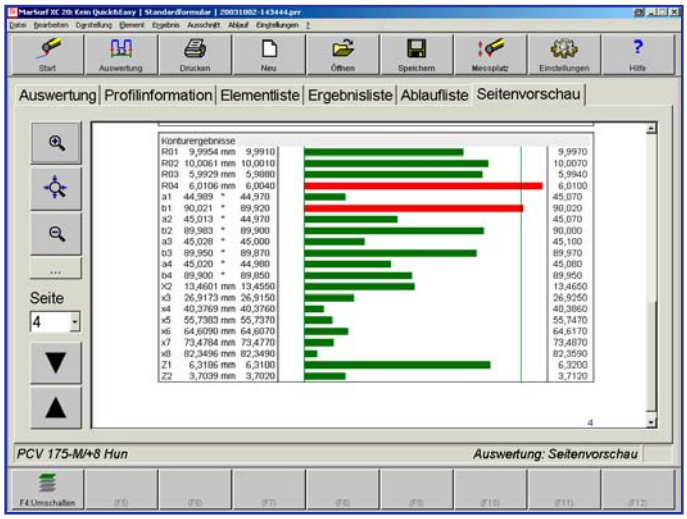
MarSurf XC 20 / XC 2

The evaluation

Graphic display of the results (enlarged deviation display)



Bar chart display

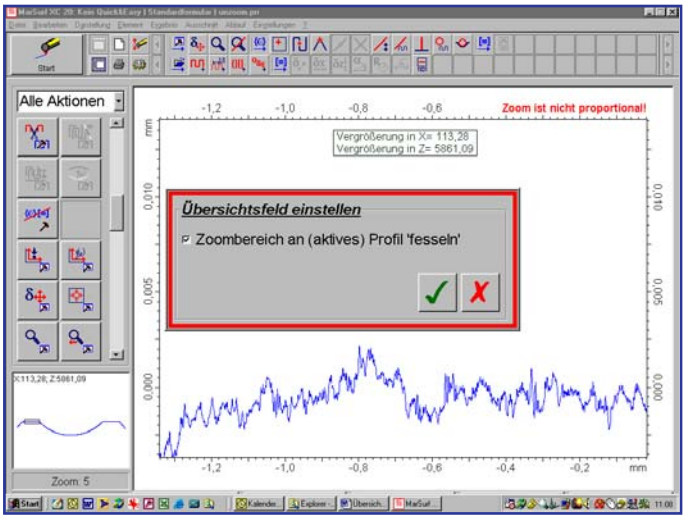


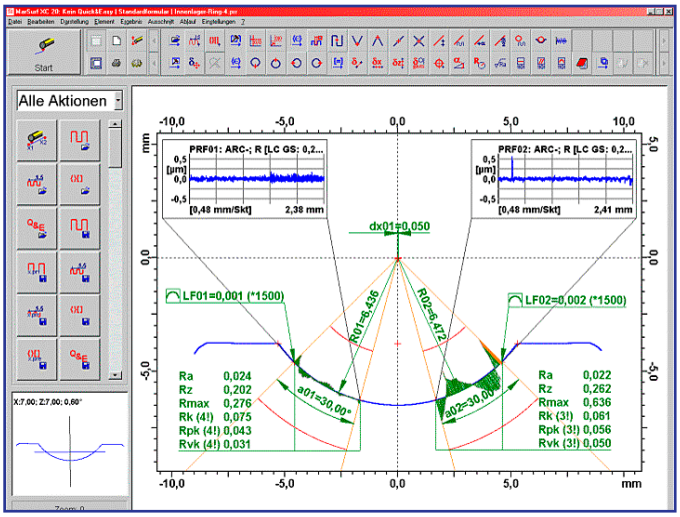
Zoom, maximum 25 steps

- Display with non-proportional zoom
- Zoom area cab be moved in the overview field
- Zoom area can be anchored to the profile

Contour display

With roughness evaluation (XC 20 with LD 120 only)





Associative elements

Changing reference contours immediately results in a change in the measured value, e.g. increasing or reducing a radius segment using the mouse directly changes the dependent variables such as radius, line form deviation, distances to the coordinate system, etc.

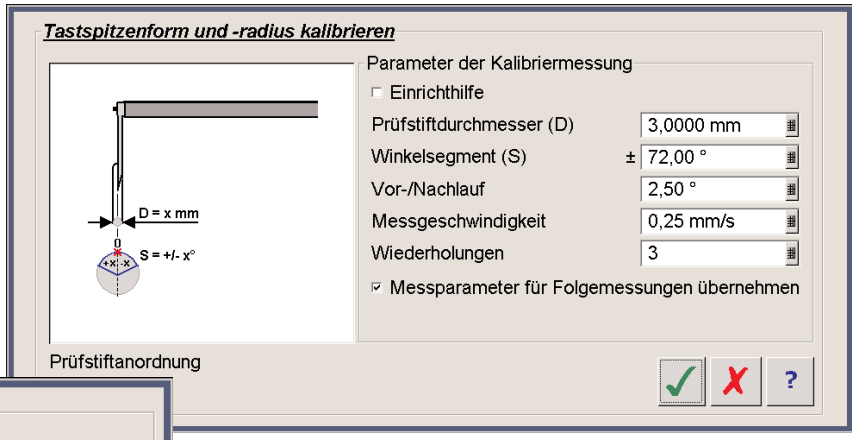
MarSurf XC 20 / XC 2

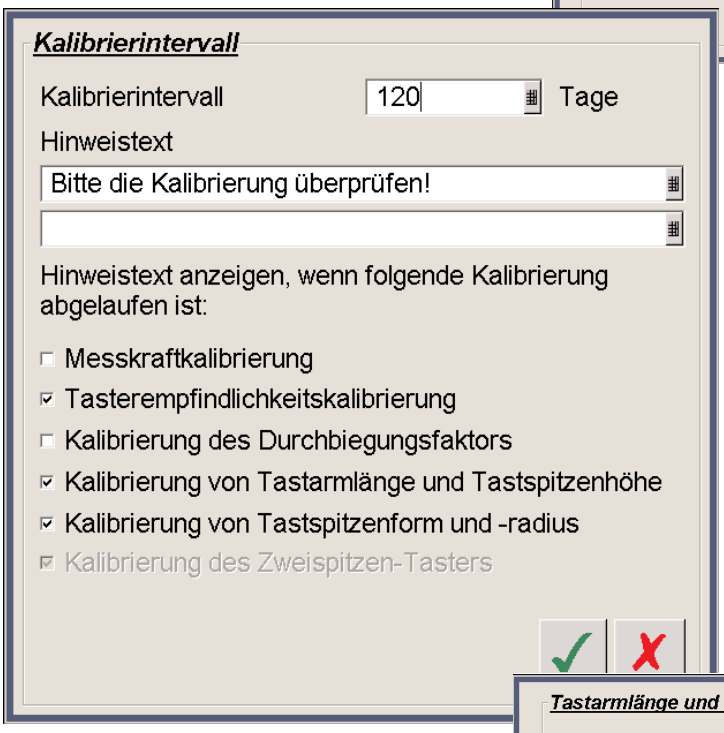
The calibration

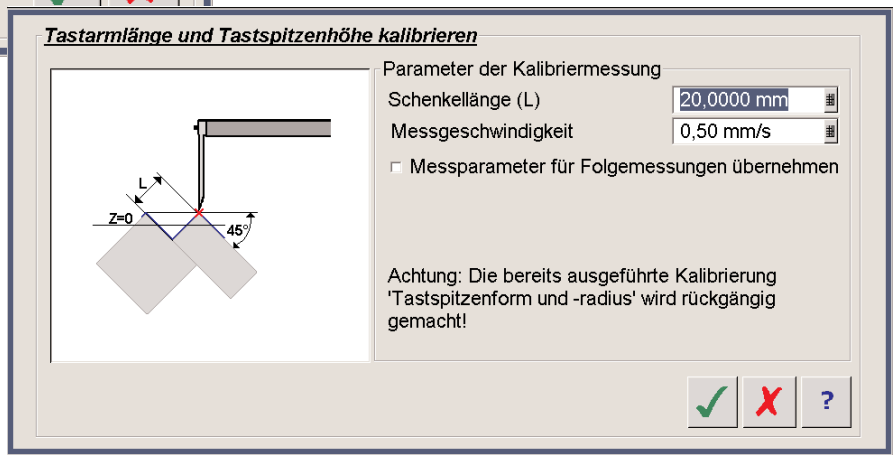
Calibration adds to the level of reliability through

- interactive operator prompting with graphic support
- documentation
- calibration intervals with reminder function
- calibration and measurement with twin stylus supported

Examples:







MarSurf XC 20 / XC 2

Online Help

Do you have any questions? If so, click

- Detailed operating instructions in the system, complete with sample applications
- Help mode (context-sensitive help)

Example:

➔ Measuring station view
➔ Help click
➔ Help text for measuring station view is displayed

Info box
When selecting an evaluation function, a short tip automatically appears for the action in question.

Automatic coordinate system

When performing a programmed, automatic measuring run, it is important for subsequent measurements that the evaluation created earlier is adapted accordingly. MarSurf XC 20 / XC 2 guarantees correct evaluation even if the workpiece is moved in x- and z- direction and for inclinations in x/z of up to 15°.

You save time, since you significantly reduce your setup time.

The time required for the evaluation drops to virtually zero.

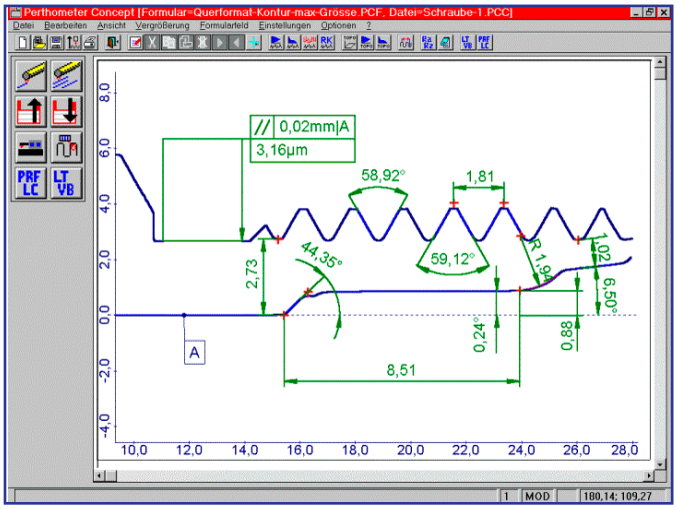
You can be sure that your results will be correct.

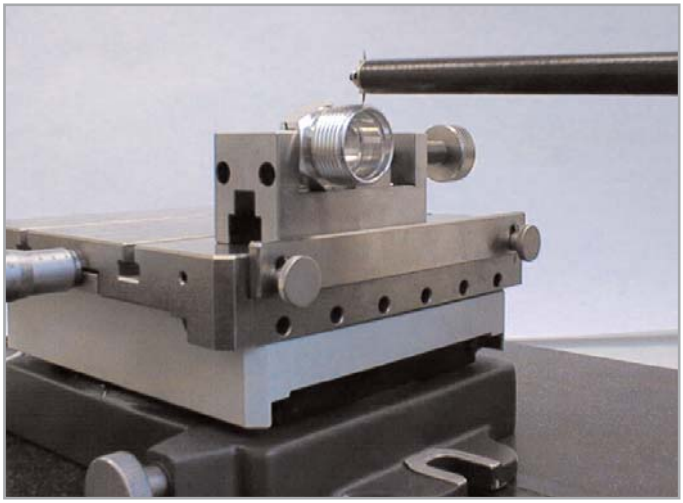
Guaranteed reproducibility, no erroneous results.

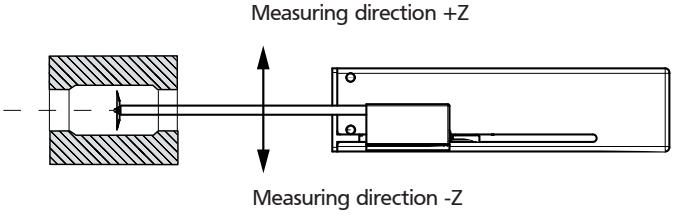
Twin stylus

Measurement with stylus tip in +Z and -Z direction

You can measure in +z and -z direction by simply switching over the direction of the measuring force.
The calibration of this stylus tip recorded earlier enables a direct link to be created between the "upper contour" and "lower contour".







MarSurf XC 20 / XC 2

Many reasons for the new contour metrology generation

► You are assured fast measuring results and save valuable time that you can devote to other tasks

- Self-explanatory user interface supported by graphic elements
- Easy programming in Teach-in mode, "learning by doing"
- Permanent online help in every programming step
- Fast measurement thanks to start/end point function

► You can be sure that your measuring results will be correct

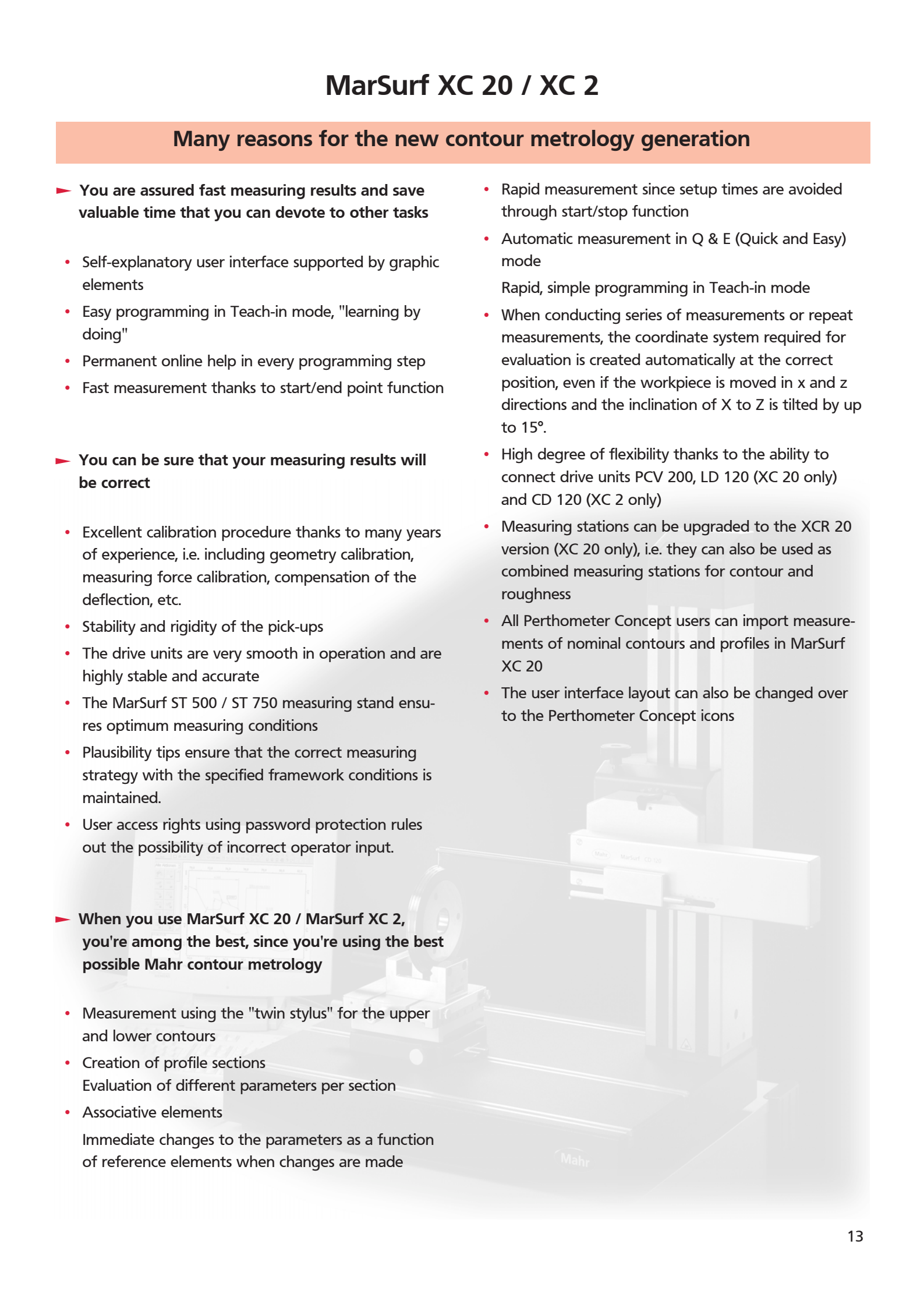
- Excellent calibration procedure thanks to many years of experience, i.e. including geometry calibration, measuring force calibration, compensation of the deflection, etc.
- Stability and rigidity of the pick-ups
- The drive units are very smooth in operation and are highly stable and accurate
- The MarSurf ST 500 / ST 750 measuring stand ensures optimum measuring conditions
- Plausibility tips ensure that the correct measuring strategy with the specified framework conditions is maintained.
- User access rights using password protection rules out the possibility of incorrect operator input.

► When you use MarSurf XC 20 / MarSurf XC 2, you're among the best, since you're using the best possible Mahr contour metrology

- Measurement using the "twin stylus" for the upper and lower contours
- Creation of profile sections
  Evaluation of different parameters per section
- Associative elements

  Immediate changes to the parameters as a function of reference elements when changes are made
- Rapid measurement since setup times are avoided through start/stop function
- Automatic measurement in Q & E (Quick and Easy) mode

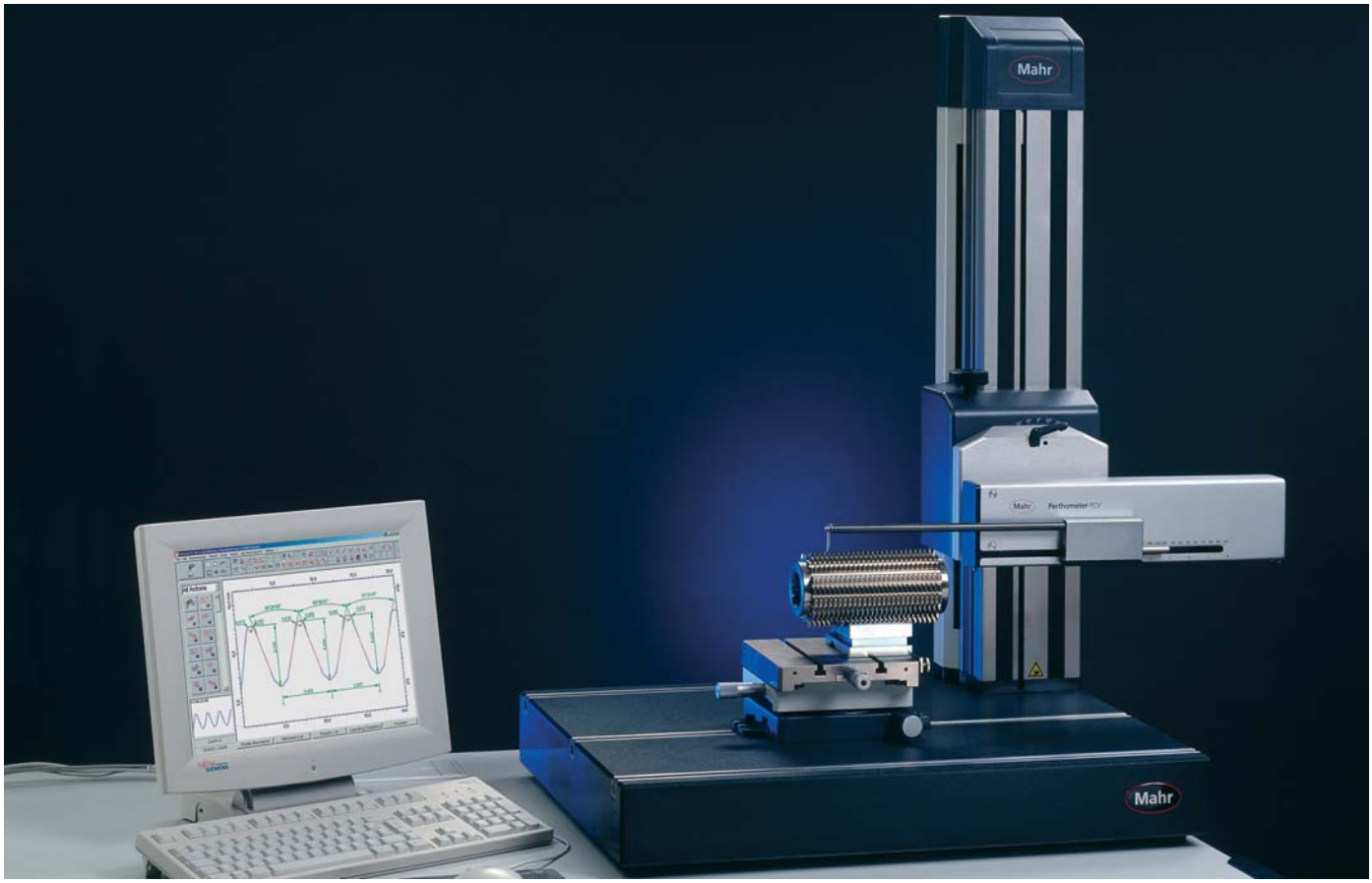
  Rapid, simple programming in Teach-in mode
- When conducting series of measurements or repeat measurements, the coordinate system required for evaluation is created automatically at the correct position, even if the workpiece is moved in x and z directions and the inclination of X to Z is tilted by up to 15°.
- High degree of flexibility thanks to the ability to connect drive units PCV 200, LD 120 (XC 20 only) and CD 120 (XC 2 only)
- Measuring stations can be upgraded to the XCR 20 version (XC 20 only), i.e. they can also be used as combined measuring stations for contour and roughness
- All Perthometer Concept users can import measurements of nominal contours and profiles in MarSurf XC 20
- The user interface layout can also be changed over to the Perthometer Concept icons



MarSurf XC 20 / XC 2

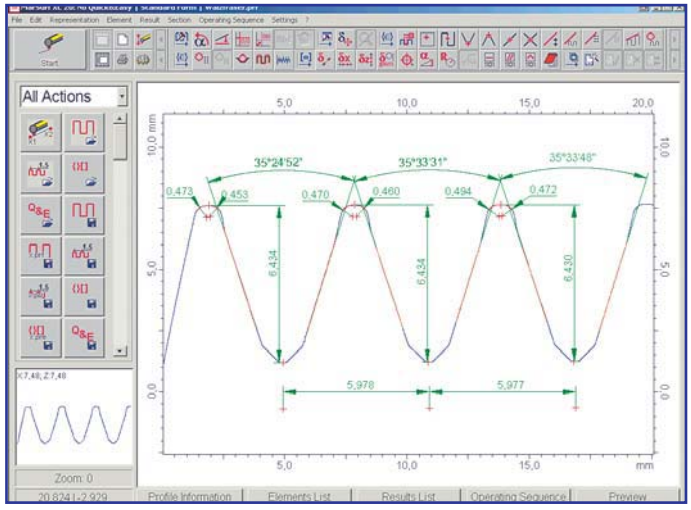
Measuring station combinations

1. XC 20 with drive unit PCV 200 and measuring stand ST 500 or ST 750



The combination of MarSurf XC 20 measurement and evaluation system, drive unit PCV 200 and measuring stand ST 500 or ST 750 gives you a powerful contour measurement station in Mahr's familiar high quality.
The contour drive unit PCV 200 is a long-range drive unit for precise determination of radii, distances, angles and straightness deviations.
The smooth travel combines with software-supported error correction to ensure reproducible measurements for high vertical and horizontal resolutions in a maximum measuring field of 200 mm x 50 mm.

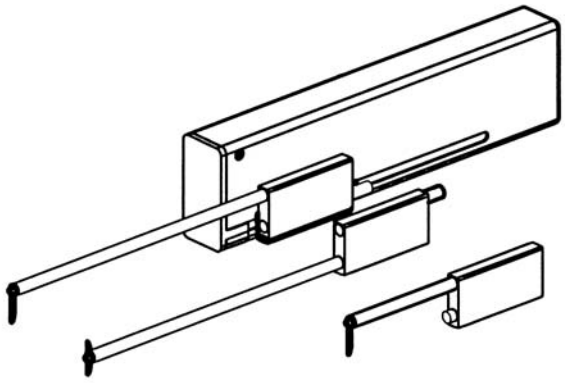
- Automatic lowering and lifting of the tracing arm with adjustable speed
- Measuring force 2 mN to 120 mN
- High positioning speed
- Patented tracing arm fastening for reproducible tracing arm exchange without need for tools
- Collision protection
- Outstanding dynamics thanks to flexurally rigid construction and use of new materials
- Positioning and selection of various measuring speeds
- No control elements on the drive unit
  ➔ Reliable result



MarSurf XC 20 / XC 2

Measuring station combinations

XC 20 with drive unit PCV 200 and measuring stand ST 500 or ST 750



Contour drive unit PCV 200:
Exchangeable tracing arms for optimum measuring task adaptation

Scope of delivery

MarSurf XC 20	6268300
Country package WIN XP Professional de (German)*	6268201
TFT monitor 15"	5460040
Printer	5460030
USB cable	3018232
Adapter PAV-CV	6840338
Drive unit PCV 200	6720810
Calibration set	6820116
Measuring stand MarSurf ST 500 with granite plate 700 mm x 550 mm	6710250
PCV 200 mount	6851361
X/Y table PKT	6710522

**Other languages on request*

Technical data

Traversing length (in X)	1 mm to 200 mm
Measuring range (in Z)	50 mm for 350 mm tracing arm 25 mm for 175 mm tracing arm
Measuring system (in X)	High-precision incremental measuring system (factory calibration with laser interferometer)
Measuring system (in Z)	Inductive transformer*, with high accuracy and linearity
Resolution (in Z) referred to stylus tip	0.50 mm for 350 mm tracing arm 0.25 mm for 175 mm tracing arm
Resolution (in Z) referred to the measuring system	0.04 µm
Guide error (in Z)	< 1 µm (over 200 mm)
Measuring force (in Z)	1 mN to 120 mN, upwards and downwards (can be set in MarSurf XC 20)
Tracing angle	On smooth surfaces depending on deflection: Descending flanks up to 88°, ascending flanks up to 77°
Measuring speed (in X)	0.2 mm/s to 4 mm/s
Contacting speed (in Z)	0.1 mm/s to 1 mm/s
Positioning speed (in X) and return speed	0.2 mm/s to 8 mm/s
Positioning speed (in Z)	0.2 mm/s to 10 mm/s
Positioning accuracy (in X)	1 µm
Positioning accuracy (in Z)	1 µm
Tracing arm length	175 mm, 350 mm
Stylus tip radius	25 µm

** Patented*

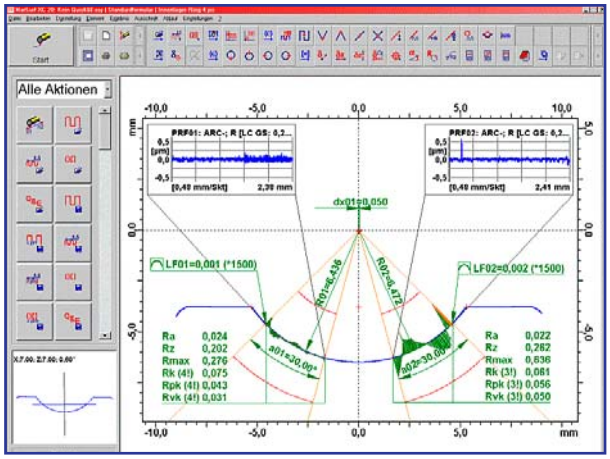
MarSurf XC 20 / XC 2

Measuring station combinations

2. XC 20 with drive unit LD 120 and measuring stand ST 500 or ST 750

Resolutions in the nm range are achieved in a combination consisting of the XC 20 with high-precision drive and tracing system LD 120 and measuring stand ST 500 / ST 750.
"Two in One" enables the contour and roughness depth to the measured in a single measuring run.
10 mm measuring stroke for 2 nm resolution and a measuring length of 120 mm are the dimensions within which the contour and roughness depth parameters are measured and evaluated with the highest accuracy.

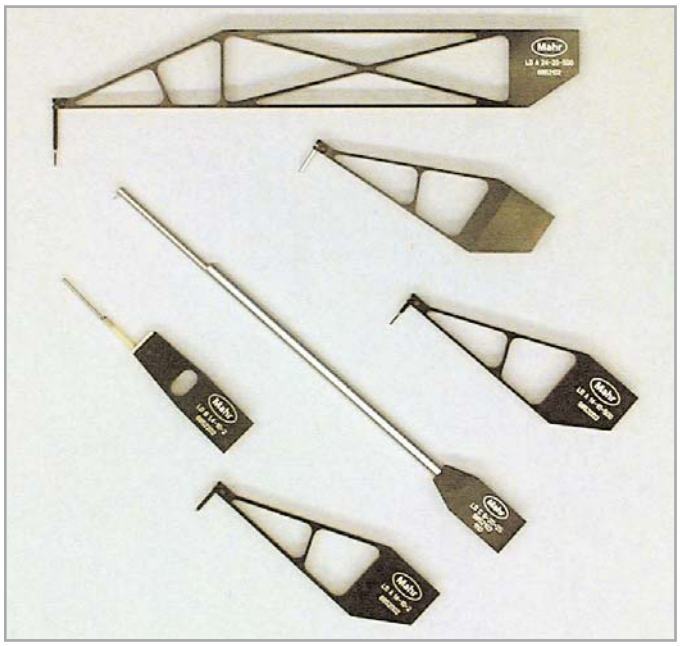
- The magnetic pick-up mount guarantees flexibility in the diversity of pick-ups and exchangeability while maintaining the same high level of reliability.
- Guaranteed positioning accuracy when exchanging pick-ups in the µm range and collision protection, rigidity and stability of the pick-ups are essential for resolutions in the nm range.
- A calibration method for ensuring the very highest accuracy gives you the assurance that your results will be correct.
- Measuring forces from 0.5 mN to 30 mN whose settings can be varied via software and which remain constant over the entire measuring stroke deliver flexibility and reliability. You can select the optimum measuring force to match the material characteristics of the testpiece and the pick-up of your choice.



MarSurf XC 20 / XC 2

Measuring station combinations

XC 20 with drive unit LD 120 and measuring stand ST 500 or ST 750



Scope of delivery

MarSurf XC 20	6268300
Country package WIN XP Professional de (German)*	6268201
TFT monitor 15"	5460040
Printer	5460030
USB cable	3018232
Adapter PAV-CV	6840338
Drive unit LD 120	6720814
Calibration set	6820116
Measuring stand MarSurf ST 500 with granite plate 700 mm x 550 mm	6710250
LD 120 mount	6851360
X/Y table PKT	6710522

**Other languages on request*

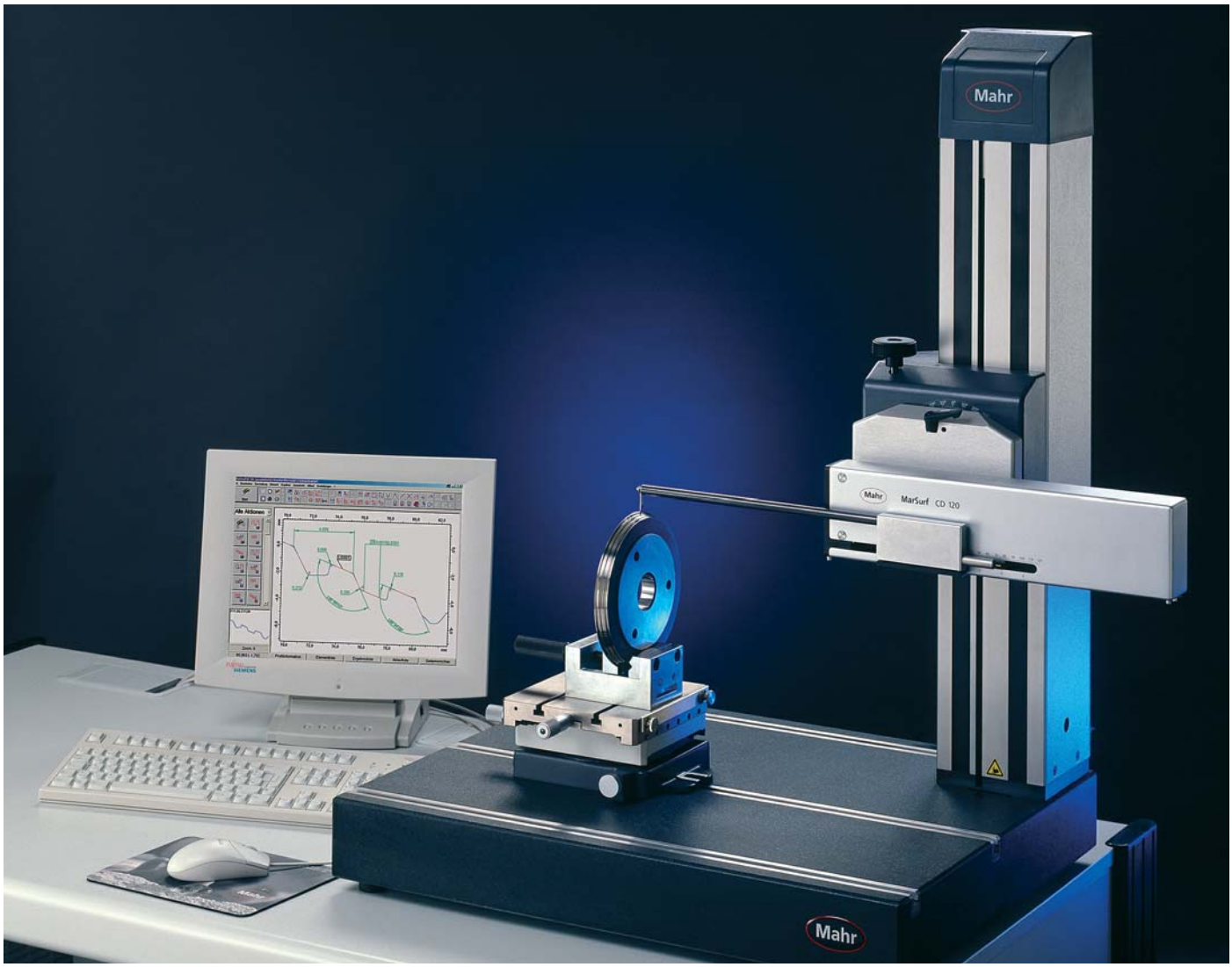
Technical data

Traversing length (in X)	0.1 mm to 120 mm
Measuring range (in Z)	10 mm
Measuring system	Interference-optical measuring systems
Standard stylus tip	LD A14-10-2, diamond 2 µm, 90°
Resolution in Z	2 nm
Horizontal measuring axis	Glass scale
Measuring point distance in X	0.05 µm to 1 µm
Contacting force	0.5 mN to 30 mN (can be set via software)
Measuring speed	0.1 mm/s to 1.0 mm/s in 0.1 mm increments for contour measurement 0.1 mm/s and 0.5 mm/s for roughness measurement
Return speed and positioning speed in X direction	Up to 4 mm/s
Guide error with straightness correction	0.12 µm/20 mm 0.25 µm/60 mm 0.4 µm/120 mm
Angle measurement	u95 < 0.5'
Radius measurement	± 0.01% of the nominal value for R12.5 mm
Distance measurement	± (1+L/100) µm

MarSurf XC 20 / XC 2

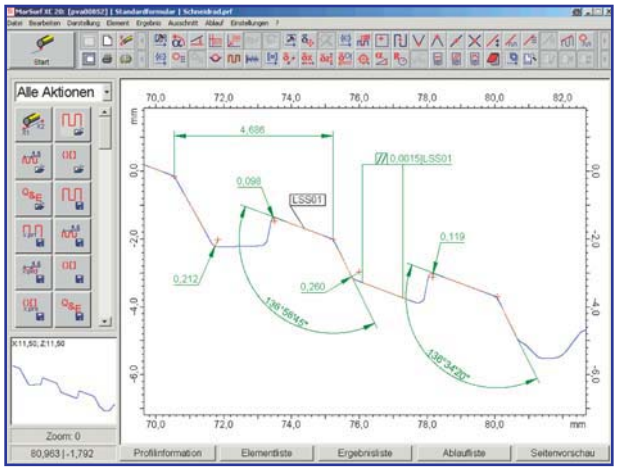
Measuring station combinations

3. XC 2 with drive unit CD 120 and measuring stand ST 500 or ST 750



The combination of the MarSurf XC 2 measurement and evaluation system, drive unit CD 120 and measuring stand ST 500 or ST 750 enables you to conduct contour measurements in a measuring field of up to 120 mm in length and 50 mm in height.

- With proven and patented tracing arm mount and straightforward exchange of application-specific tracing arms
- Collision protection
- Measuring force 2 mN to 120 mN, selectable
- Operation and positioning is controlled via the software in a special measuring station view
- Programmed measuring run
- No control elements on the drive unit
  ➔ A reliable result



MarSurf XC 20 / XC 2

Measuring station combinations

XC 2 with drive unit CD 120 and measuring stand ST 500 or ST 750

Scope of delivery	
MarSurf XC 2	6268305
Country package WIN XP Professional de (German)*	6268201
TFT monitor 15"	5460040
Printer	5460030
USB cable	3018232
Adapter PAV-CV	6840338
Drive unit CD 120	6720812
PCV calibration set	6820116
MarSurf ST 500 measuring stand with granite plate 700 mm x 550 mm	6710250
PCV mount	6851362
X/Y table PKT	6710522

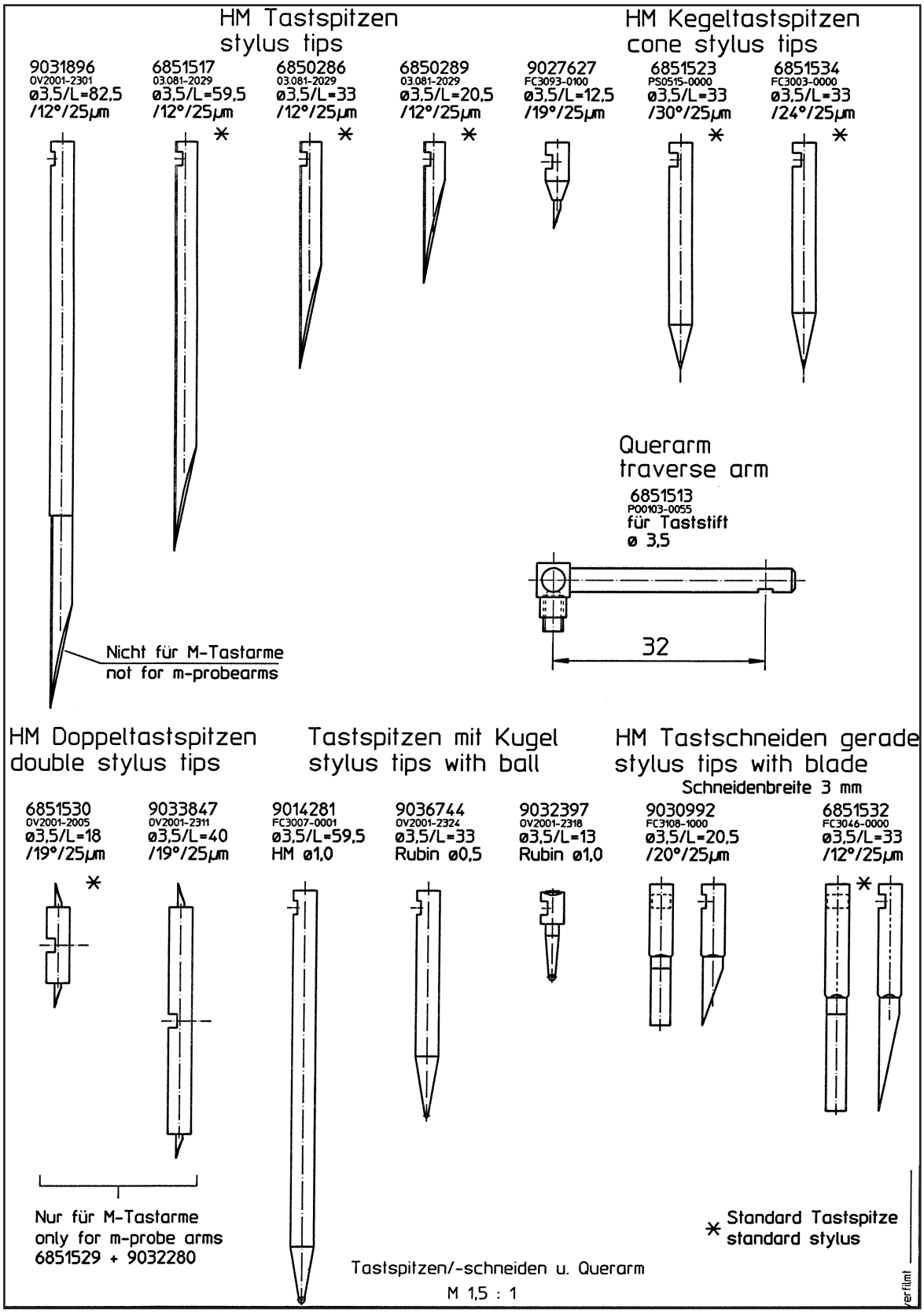
Technical data

Traversing length (in X)	1 mm to 120 mm
Measuring range (in Z)	50 mm for 350 mm tracing arm 25 mm for 175 mm tracing arm
Measuring system (in X)	High-precision incremental measuring system (factory calibration with laser interferometer)
Measuring system (in Z)	Inductive transformer*, with high accuracy and linearity
Resolution (in Z) referred to stylus tip	0.50 mm for 350 mm tracing arm 0.25 mm for 175 mm tracing arm
Resolution (in Z) referred to the measuring system	0.04 µm
Guide error (in Z)	< 1 µm (over 120 mm)
Measuring direction (in X)	Forwards, backwards
Contacting direction (in Z)	Downwards (-Z), upwards (+Z)
Measuring force (in Z)	1 mN to 120 mN, upwards and downwards (can be set in MarSurf XC 2)
Tracing angle	On smooth surfaces depending on deflection: Descending flanks up to 88°, ascending flanks up to 77°
Measuring speed (in X)	0.2 mm/s to 4 mm/s
Contacting speed (in Z)	0.1 mm/s to 1 mm/s
Positioning speed (in X) and return speed	0.2 mm/s to 8 mm/s
Positioning speed (in Z)	0.2 mm/s to 10 mm/s
Positioning accuracy (in X)	1 µm
Positioning accuracy (in Z)	1 µm
Tracing arm length	175 mm, 350 mm
Stylus tip radius	25 µm

**patended*

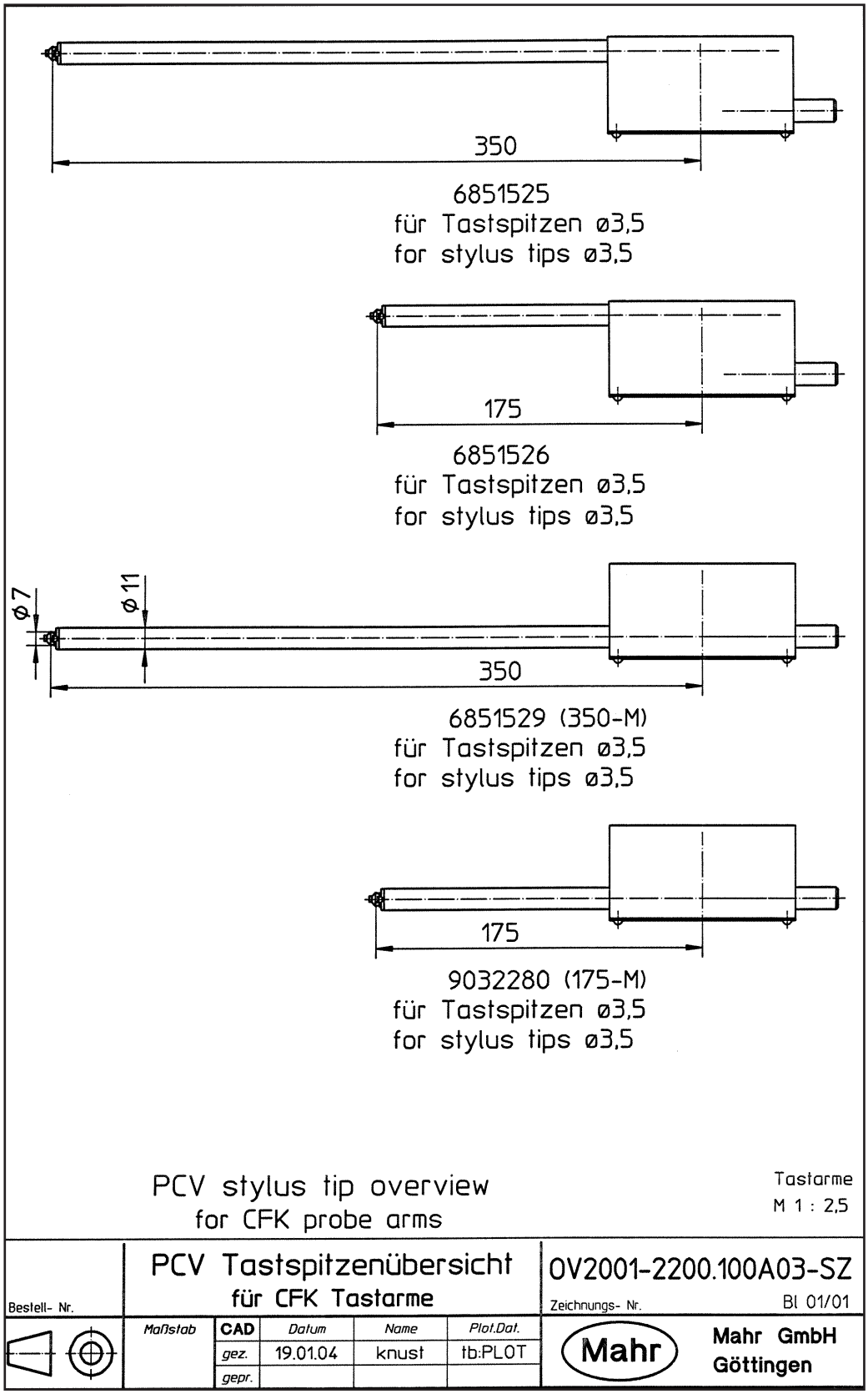
Tracing arms / stylus tips

Stylus tips



Tracing arms / stylus tips

Tracing arms of carbon fiber reinforced plastic



Tracing arms / stylus tips

CP 175 M tracing arms