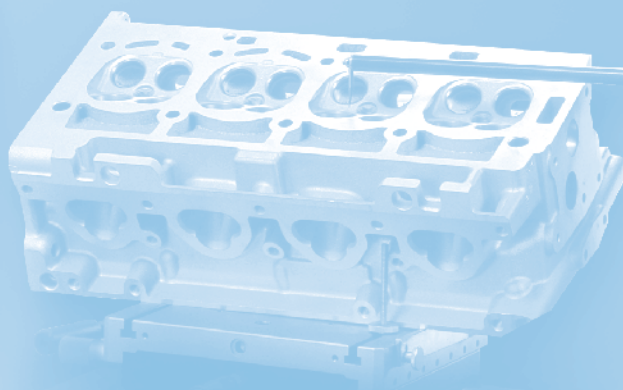
The logo for Mahr EXACTLY. It features a red vertical line at the top, followed by the text "- 0 +" in a small, black, monospaced font. Below this is the word "Mahr" in a large, bold, black sans-serif font, which is enclosed within a red oval. At the bottom, the word "EXACTLY" is written in a red, spaced-out, monospaced font.



CONTOUR MEASUREMENT WITH EXPERIENCE. EVEN GREATER FLEXIBILITY WITH MARWIN



You can find the latest information about
MARSURF products on our website:
www.mahr.de, WebCode 20554 and 20561



► In industrial manufacturing metrology the need for quick and easy measurement of workpiece profiles is on the rise. The wide variety of measuring tasks demand ever greater precision and optimum measuring strategies for the overall system. We are delighted to announce the arrival of the MarSurf XC 20/MarSurf XC 2 contour measuring and evaluation system based on MarWin. Decades of experience in contour metrology combined with the expectations of and feedback from our customers have helped to shape this new generation of devices. What started some 40 years ago with the Conturograph, namely a drive unit and x-y recorder used for recording contours and comparing them with templates, has grown into a top-quality contour measuring system featuring cutting-edge technology. This is true of the whole measuring station, consisting of the measuring and evaluation system, drive unit, probe as well as the measuring stand and equipment table or cabinet. MarSurf XC 20 and MarSurf XC 2 are your guarantee of outstanding quality and reliability.



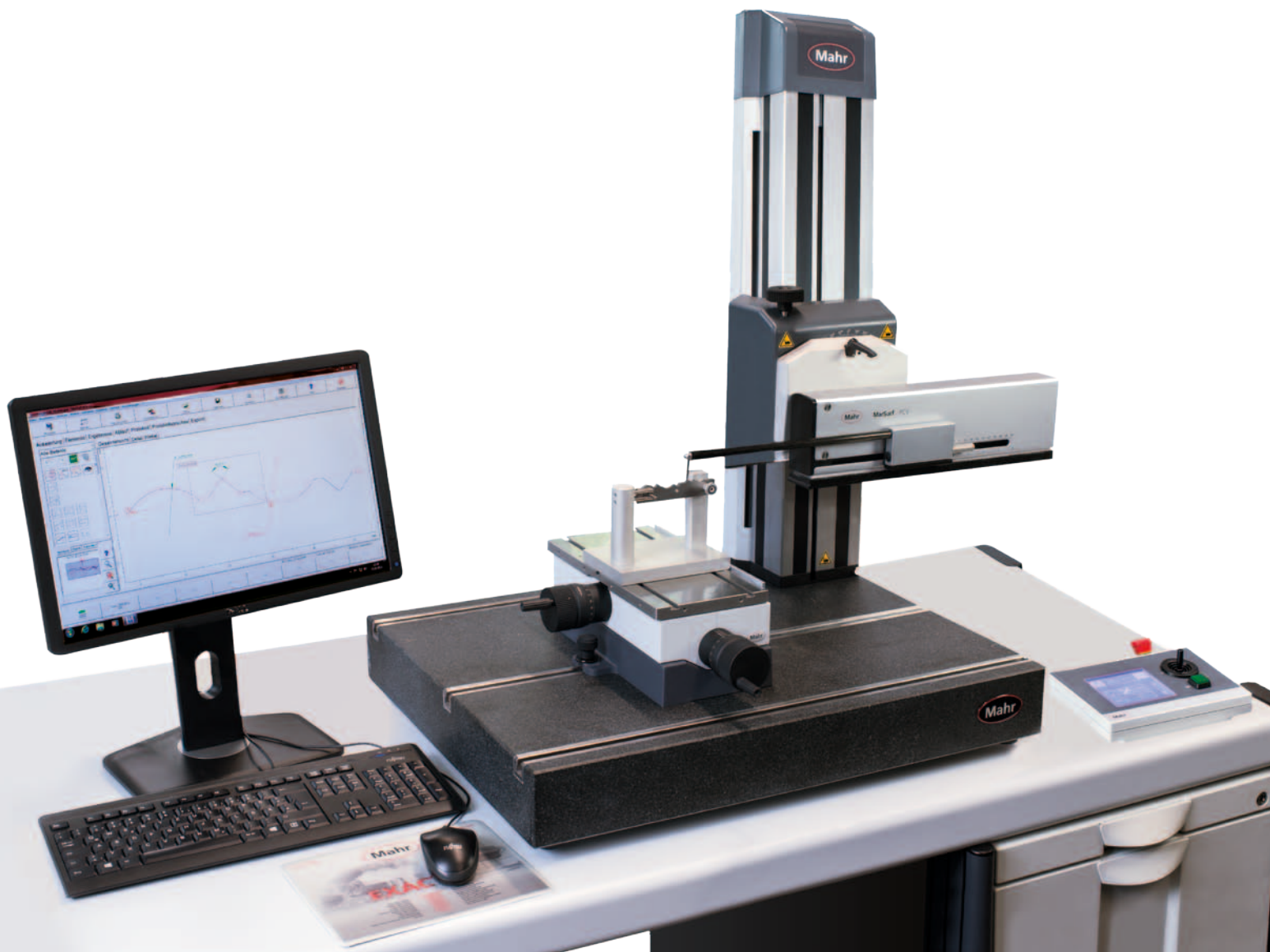
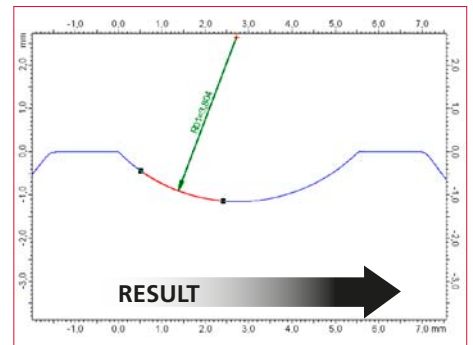
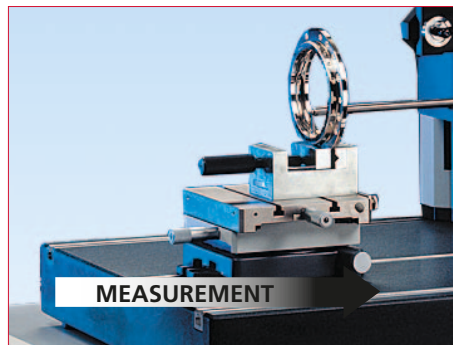
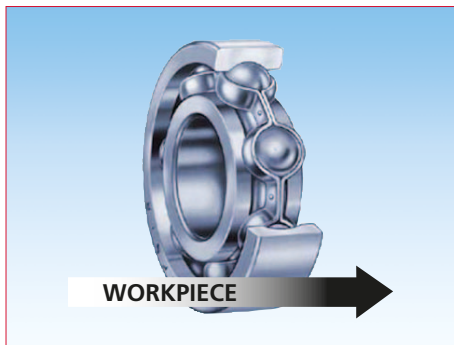
► | MarSurf XC 2 / XC 20

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MarSurf. PC-based stationary contour measuring stations

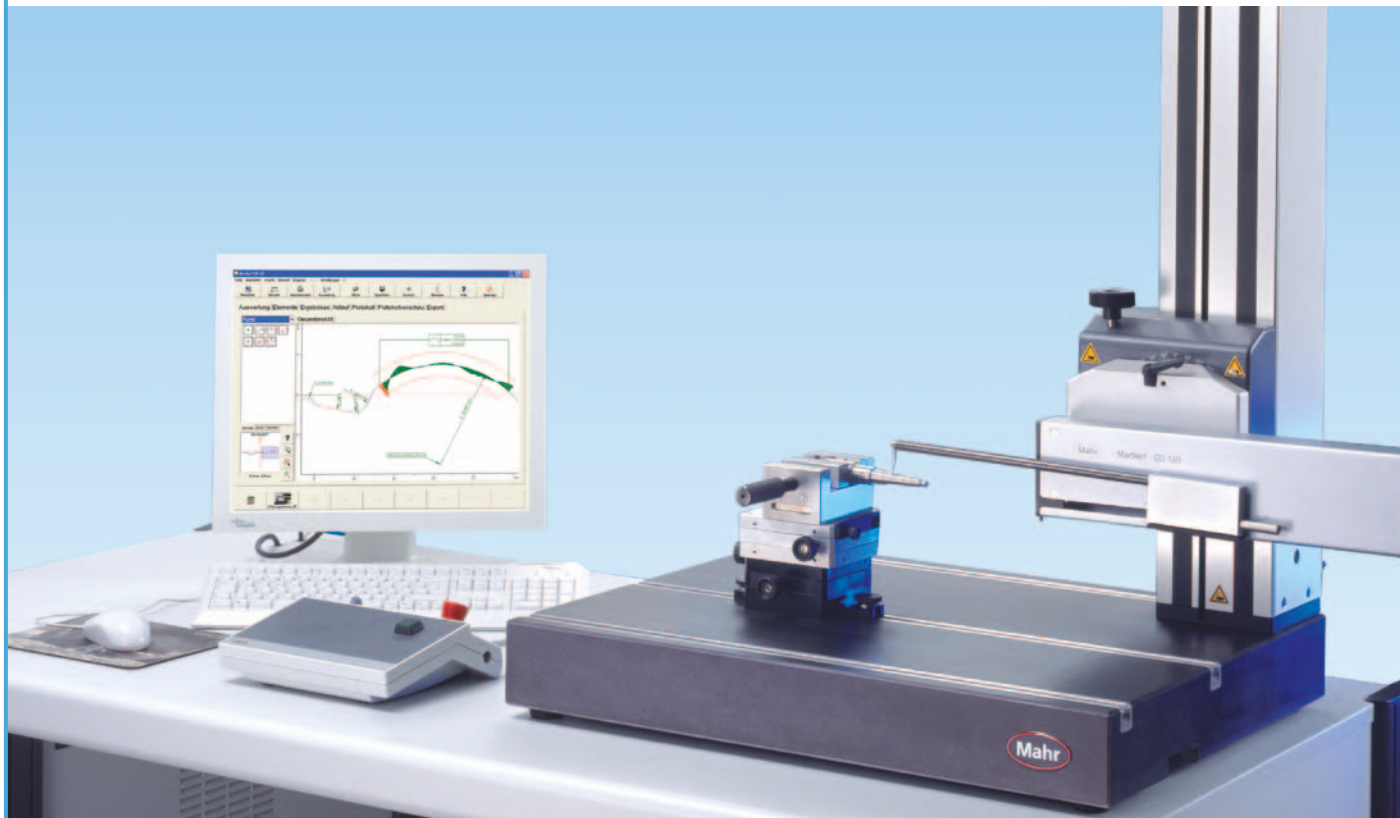
VERSATILE AND POWERFUL IN MEASURING ROOMS AND PRODUCTION

► | Measuring and evaluating function-related geometries on workpieces and tools are basic requirements in research, engineering and industry. The tried-and-tested 2D contour measuring system is increasingly becoming the technology of choice compared to other methods because it is faster, simpler and offers better value for money. A measured profile can be quickly and easily evaluated, ensuring safe and reliable results in keeping with the growing demands in terms of accuracy and evaluation criteria. | ◀



MarSurf XC 2

Easy contour measurement



Description

The **MarSurf XC 2** is the perfect introduction to Mahr's cutting-edge contour metrology. The PC-based instrument offers all the performance features required for contour measurement and evaluation both in measuring rooms and in production.

Clearly laid-out icons and convenient user-friendly help make this practical product easy to handle. The **MarSurf XC 2** combines decades of experience in contour metrology with state-of-the-art, pioneering technology.

MarSurf XC 2 is Mahr's future-oriented, MarWin-based contour evaluation software.

Features

The MarSurf XC 2 is a basic entry-level measuring station for measuring contours. In addition to the tried-and-tested and optimally coordinated measuring station components, such as the probe system, drive unit and measuring stands etc., the role of software is growing in importance.

Simple, intuitive basic functions are also particularly important for the user, who can perform basic operations in a targeted way. The "MarWin" universal measuring and evaluation software allows you to start up the instrument using the simple start/stop function. Basic geometric functions for the evaluation are displayed as icons in a toolbox menu.

Below are some of the main functions:

- Creating regression lines and circles
- Creating points, intersection points, free points, center points, max-min points
- Creating coordinate systems
- Calculating radii, distances, angles, coordinates, line form deviations
- Reference/actual comparisons
- Tolerance monitoring
- Automatic program sequences
- Importing profile data e.g. DXF files (optional)

The range of user levels protects the device against misuse and prevents unauthorized people from using it.

MarSurf XC 2

The easy introduction to contour measurement



Description

The **MarSurf XC 2** can perform all the standard contour measuring tasks. Simple and quick to use with a high level of performance.

MarSurf XC 2 measuring station

MarSurf XC 2 order no. 6268356
including Midrange standard control unit, XC 2 software,
Mahr license key

MarWin PC* order no. 9XXXXX
TFT 24" monitor order no. 3027221
MCP 23 manual control panel order no. 7035195
CD 120 drive unit order no. 6720812
ST-500 measuring stand order no. 6710250
with solid granite plate 700 mm x 550 mm
PCV/CD 120 holder order no. 6851362
CT 120 XY table order no. 6710529
Rotary adjustment for CT 120 order no. 6710547
Standard contour calibration set order no. 6810124

Optional:
PPS parallel vise order no. 6710604

Further information can be found on our website under
WebCode 20562.

As soon as the user begins to operate the instrument, he will appreciate the benefits of its logical and easy handling.

There is a wide range of different probe arms and stylus tips available for outer and inner measurements.

Thanks to the magnetic probe arm holders, probe arms can be changed over quickly without the need for any tools. Calibration data is saved for every probe arm that has ever been calibrated.

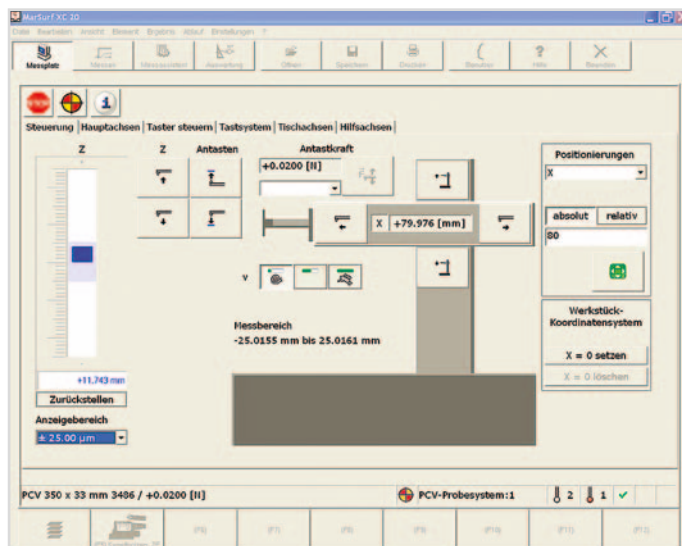
Calibration of the measuring station is quick and easy, as is the first measurement. The visual representation of the measuring station showing the axis positions makes the setup process much faster. All the measuring conditions are selected in the "measuring assistant" menu to allow a precise measurement.

A "start point-end point measurement" function helps you with your first measurement. The profile curve is even shown on-screen during the measurement.

The evaluation can be carried out immediately after the measurement. The QE (Quick & Easy) saving of profile data, the evaluation, results and the entire program means that the process is permanently documented. The user enters a complete measuring record containing the main text and evaluation notes in the "measuring record" menu.

The **MarSurf XC 2** makes your measurements:

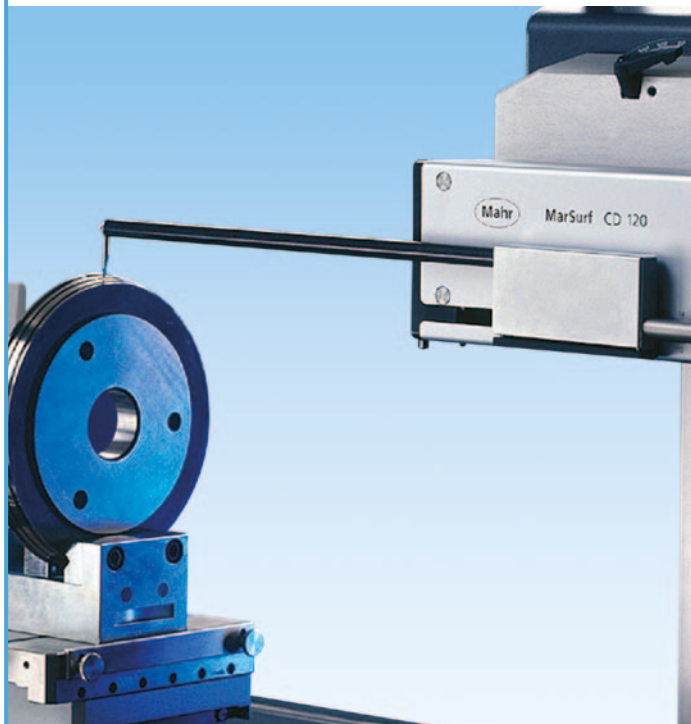
simple
fast
reliable



*Position depends on country

MarSurf XC 2

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



The CD 120 contour drive unit is one of the main components of the measuring station.

Precise determination of radii, distances, angles and straightness essentially depends on the quality and technical features of the drive unit.

The smooth-running drive in combination with computer-aided error correction ensures reproducible measurements at a high vertical and horizontal resolution.

ST 500 measuring stand (optional ST 750)

- Granite plate 700 mm x 550 mm (L x W) with three 10 mm wide T-grooves
- Measuring column with electrical height adjustment range of 500 mm* for the drive unit
- Easy to replace holders
- The measuring stand includes a manual mechanical angle adjustment for the drive unit

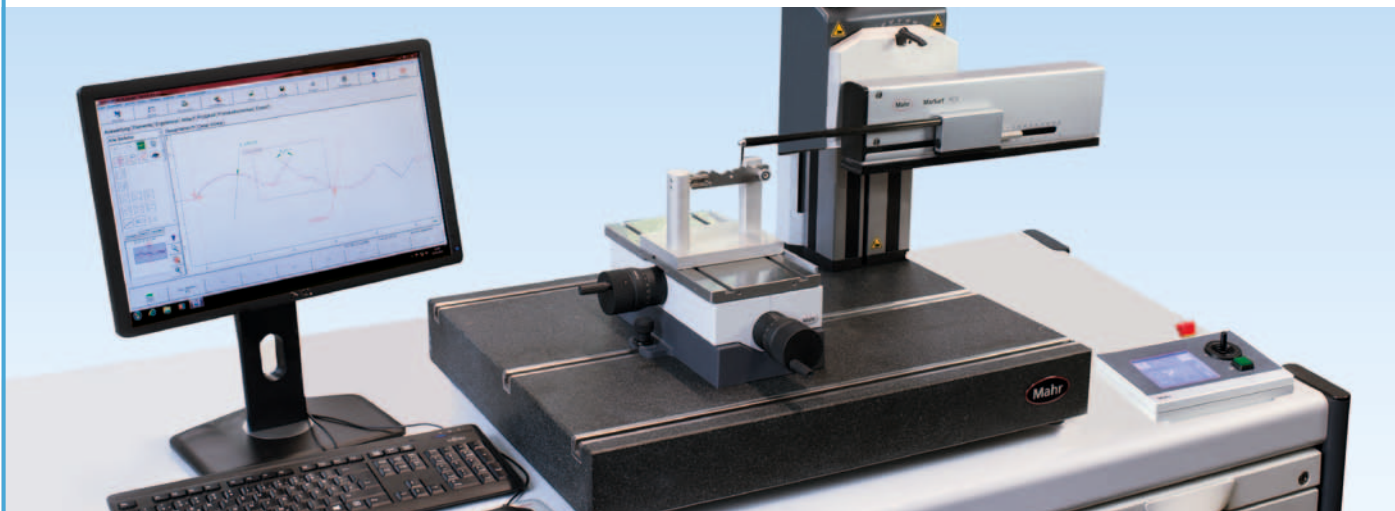
* ST 750 = 750 mm

Technical data

Traversing length (in X)	0.2 mm to 120 mm
Measuring range (in Z)	50 mm with 350 mm probe arm 25 mm with 175 mm probe 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) relative to stylus tip	0.38 µm with 350 mm probe arm 0.19 µm with 175 mm probe arm
Resolution (in Z) relative to measuring system	0.04 µm
Guide deviation	< 1 µm (over 120 mm)
Direction of measurement (in X)	forwards (+X), backwards (-X)
Contacting direction (in Z)	downwards (-Z), upwards (+Z)
Measuring force (in Z)	1 mN to 120 mN, up and down (adjustable in MarSurf XC 2)
Sampling angle	on smooth surfaces, depending on deflection: trailing edges up to 88°, leading edges 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)	0.2 mm/s to 8 mm/s
and return speed	0.2 mm/s to 10 mm/s
Positioning speed (in Z)	175 mm, 350 mm
Probe arm length	25 µm
Tip radius	

MarSurf XC 20

Contour measurement of the highest order



Description

The **MarSurf XC 20** offers many more performance features than the **MarSurf XC 2** measuring station already described. The measuring station pictured above shows the **MarSurf XC 20** system with the **PCV 200** drive unit and the **ST 500** measuring stand. It can perform complex contour measuring tasks in all areas.

PCV 200 drive unit

Traversing length 0.2 mm to 200 mm
Measuring range (in Z) 50 mm

The extensive range of probe arm and stylus tips for various tasks includes a twin stylus probe (see page 27), which can be used to measure the top and bottom profile of a workpiece by way of multiple measurement, without having to change the probe arm.

ST 500 measuring stand (optional ST 750)

- Granite plate 700 mm x 550 mm (L x W) with three 10 mm wide T-grooves
- Measuring column with electrical height adjustment range of 500 mm* for the drive unit
- Easy to replace holders
- The measuring stand includes a manual mechanical angle adjustment for the drive unit

* ST 750 = 750 mm

Further information can be found on our website under **WebCode 20563**.

Features

The **PCV 200** drive unit offers a measuring length of 200 mm and a stroke of 50 mm. It offers numerous additional software functions compared to the **MarSurf XC 2** (see table page 11). To name but a few:

Sections

You can create as many sections as you like. Each area is printed out in a dedicated field in the measuring record.

Measurement with a twin stylus probe

Opposing profiles, such as in holes or even external geometries, can be measured with the twin stylus probe. The two "opposing" profiles can then be evaluated with the XC-20 software as standard. This information can be used to calculate dimensions that refer to the relationship of the two profiles.

MarSurf XC 20 measuring station

MarSurf XC 20 order no. **6268363**
including Midrange standard control unit, XC 20 software, Mahr license key

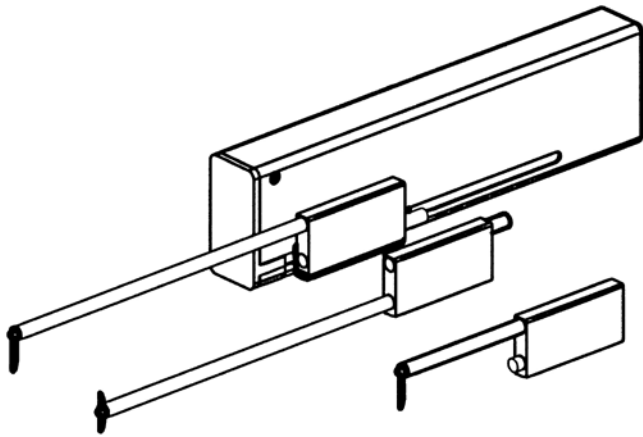
MarWin PC* order no. **9XXXXXX**
TFT 24" monitor order no. **3027221**
MCP 23 manual control panel order no. **7035195**
PCV 200 drive unit order no. **6720810**
ST-500 measuring stand order no. **6710250**
with solid granite plate 700 mm x 550 mm
PCV/CD 120 holder order no. **6851362**
CT 300 XY table order no. **6710549**
Standard contour calibration set order no. **6810124**

Optional:
PPS parallel vise order no. **6710604**

*Position depends on country

MarSurf XC 20

PCV 200 contour drive unit



Interchangeable probe arms for optimal adaptation to measuring tasks

Advantages

- Automatic lowering and raising of the probe arm with adjustable speed
 - Measuring force 1 mN to 120 mN
 - High positioning speed
 - Patented probe arm attachment with reproducible probe arm changeover without tools
 - Collision protection
 - Excellent dynamics thanks to rigid design and the use of new materials
 - Range of different positioning and measuring speeds
 - No control elements on the drive unit
- ➔ Reliable results

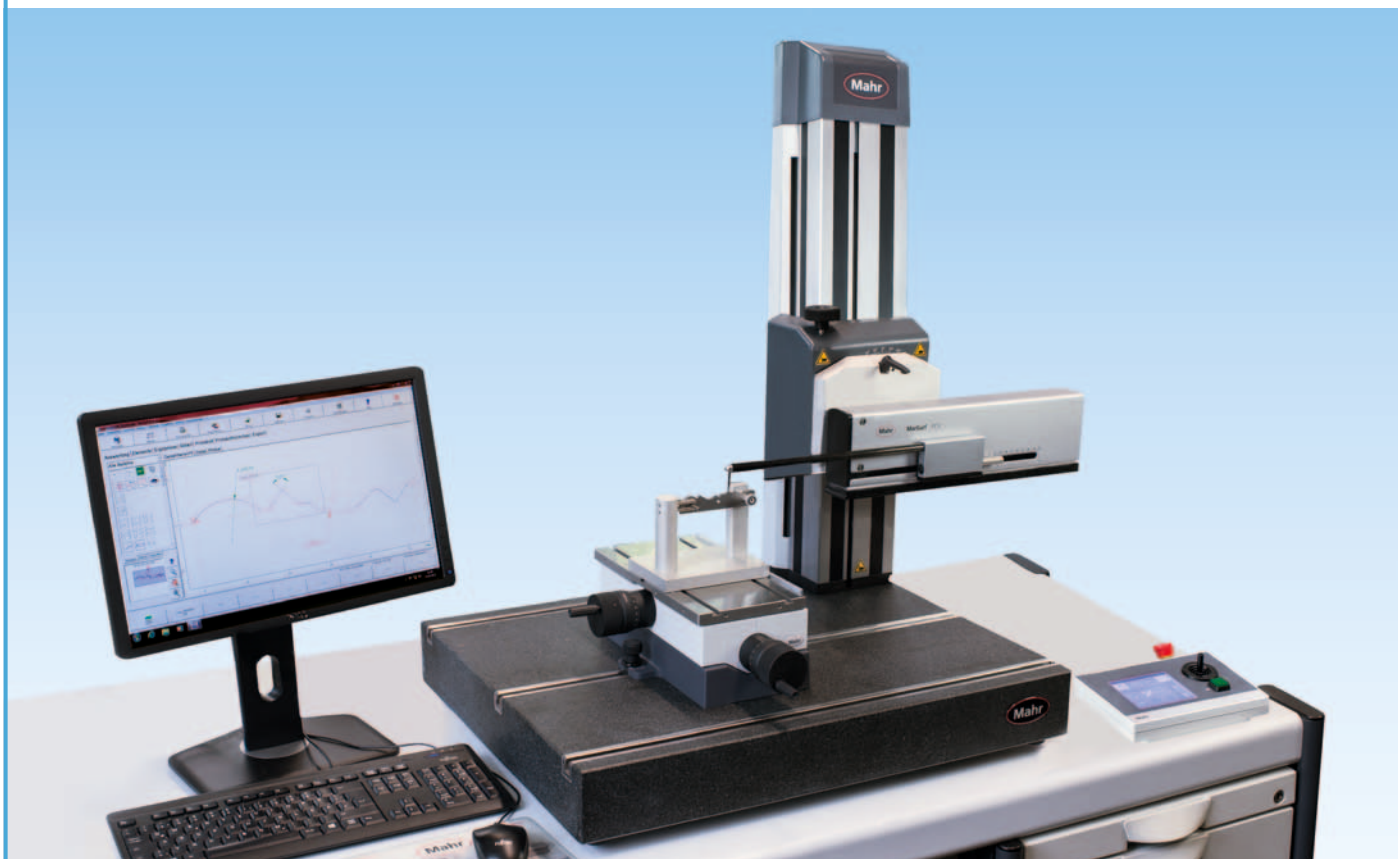
Technical data

Traversing length (in X)	0.2 mm to 200 mm
Measuring range (in Z)	50 mm with 350 mm probe arm 25 mm with 175 mm probe 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) relative to stylus tip	0.38 µm with 350 mm probe arm 0.19 µm with 175 mm probe arm
Sampling rate (in X)	1.0 µm to 8.0 µm
Resolution (in Z) relative to measuring system	0.04 µm
Guide deviation	<1 µm (over 200 mm)
Measuring force (in Z)	1 mN to 120 mN, up and down (adjustable in MarSurf XC 20)
Sampling angle	on smooth surfaces, depending on deflection: trailing edges up to 88°, leading edges up to 77°
Measuring speed (in X)	0.2 mm/s to 4 mm/s, adjustable in 0.1 mm/s increments
Contacting speed (in Z)	0.1 mm/s to 1 mm/s, adjustable
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
Probe arm length	175 mm, 350 mm
Tip radius	25 µm

MarSurf XC 2 / XC 20. Configuration of a standard measuring station

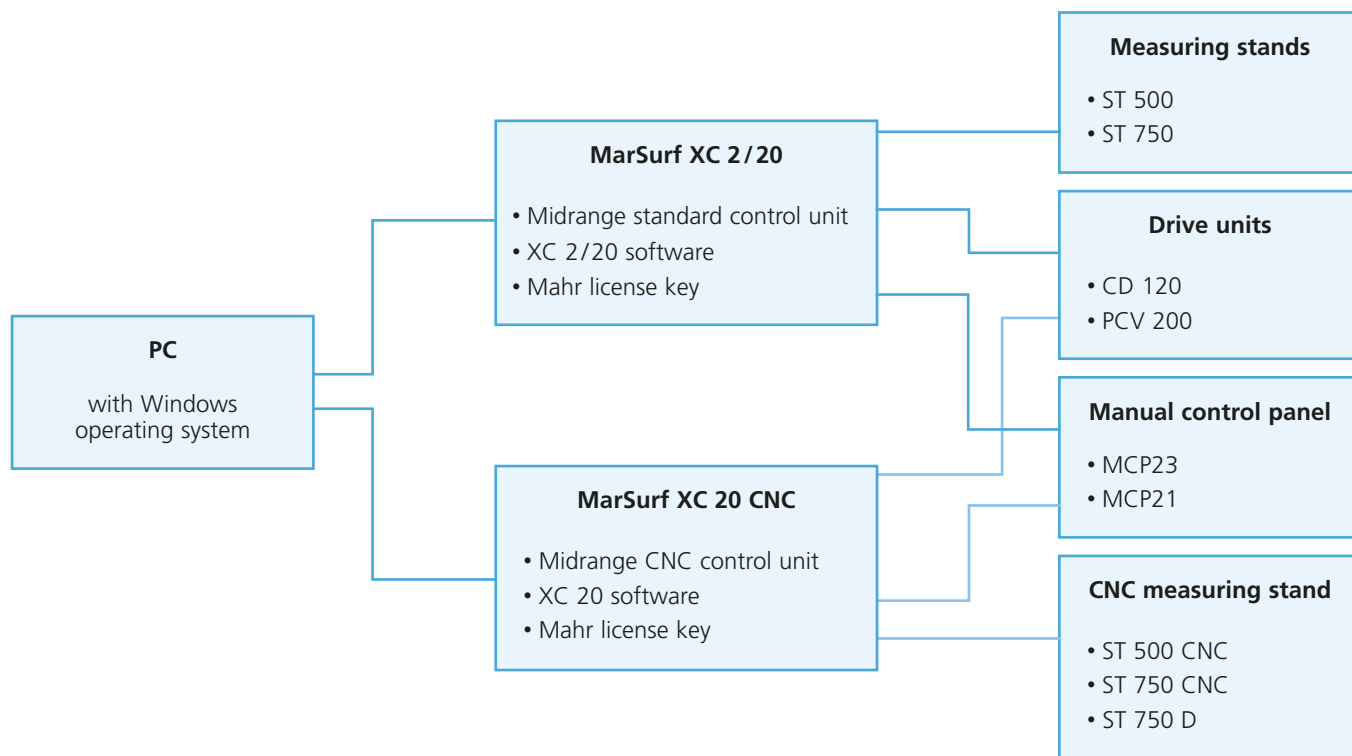


MarSurf XC 2 measuring station



MarSurf XC 20 measuring station

MarSurf XC 2 / XC 20. Configuration of a standard measuring station

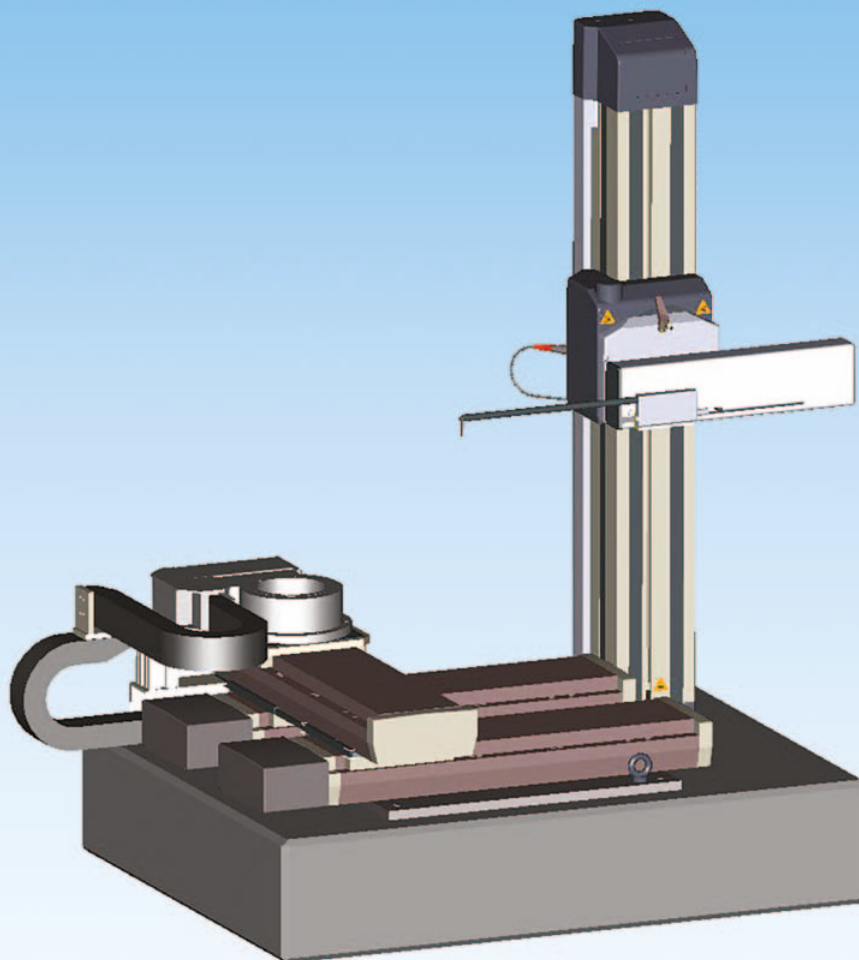


XC 2 / XC 20 systems. The main features

	MarSurf XC 2	MarSurf XC 20
Drive unit connection	CD 120/PCV 200	PCV/CD 120/LD 130/LD 260/UD 130
Creating sections (detailed views)	–	✓
Twin stylus probe	– (calibration is possible, however unable to evaluate multiple profiles)	✓
Measuring assistant	reduced, basic version	All levels available
DXF import	optional with license	✓
Multiple measurement	–	✓
Run MPR programs	–	✓
User-defined measuring record	–	✓
Area calculation	–	✓
Sequence list	–	✓
Tolerance zones	only 1 tolerance zone	any number
Tangential elements function	optional with license	✓
Thread evaluation	optional only, however just for one profile as multiple measurement is not possible. Diameter-related parameters, therefore, cannot be evaluated	possible with the thread measurement option
Chamfer evaluation	–	possible with the chamfer option
Upgradeable to XCR 20	–	✓
Upgradeable to XC 20 CNC	–	✓

MarSurf XC 20 CNC

Automated measuring with multiple axes



Description

All the connected measuring stands offer motorized height adjustment via the buttons on the monitor or the keyboard and can be positioned by the user on the workpiece in accordance with the measuring points.

With the MarSurf XC 20 CNC model, the ST 500 CNC / ST 750 CNC measuring stand can also be used for height positioning via the Midrange CNC control unit in automatic mode.

Package contents

Depending on the respective configuration

MarSurf XC 20 CNC measuring station

MarSurf XC 20 CNC order no. 6268364
including Midrange CNC control unit, XC 20 software,
Mahr license key

MarWin PC* order no. 9XXXXXX
TFT 24" monitor order no. 3027221
MCP 21 advanced manual control panel order no. 7033935

PCV 200 drive unit order no. 6720810
ST 750 CNC measuring stand order no. 6710252
with solid granite plate 700 mm x 550 mm
Hz control module order no. 6851376
PCV/CD 120 holder order no. 6851362
CT 300 XY table order no. 6710549
Standard contour calibration set order no. 6810124
PCV collision protection order no. 7033957

Optional:
PPS parallel vise order no. 6710604

*Position depends on country

XC 20 CNC Measuring Station with ST 750 D Measuring Stand – Measuring Station for Large Workpieces

Description

The standards expected of contour metrology have dramatically risen in recent years. This is because customers prefer a simple 2D contour measuring station solution to a 3D measuring machine because of the value for money it represents and its high accuracy. It can record and measure the widest range of workpiece geometries.

Mahr was the first measuring instrument manufacturer to develop the so-called twin stylus probe for contour metrology.

This probe allowed the top and the bottom of the contours to be captured. Typical measuring tasks include, for example, thread measurement and the associated diameter measurement. Up until now this measuring task was limited by the stroke of the probe system in the PCV drive unit, which has a maximum measuring stroke of 50 mm.

In other words, diameter measurements and distance measurements with the twin stylus probe were restricted by the stroke of the probe and the height of the double tip. This restriction has been significantly improved by using the ST 750 D measuring stand with the MarSurf XC 20 CNC.

The measuring stand has a glass scale in the vertical axis and thus allows a distance measurement of up to 620 mm in the Z-axis. This means that measuring tasks can also be performed on larger workpieces.



XC 20 CNC measuring station with ST 750 D measuring stand

MarSurf XC 20 CNC order no. 6268364
including Midrange CNC control unit, XC 20 software,
Mahr license key

MarWin PC* order no. 9XXXXXX
TFT 24" monitor order no. 3027221

MCP 21 advanced manual control panel order no. 7033935
PCV 200 drive unit order no. 6720810
ST 750 D measuring stand order no. 6710255

with solid granite plate 700 mm x 550 mm

ST 750 D control module order no. 6851389

PCV/CD 120 holder order no. 6851362

CT 300 XY table order no. 6710549

Standard contour calibration set order no. 6810124

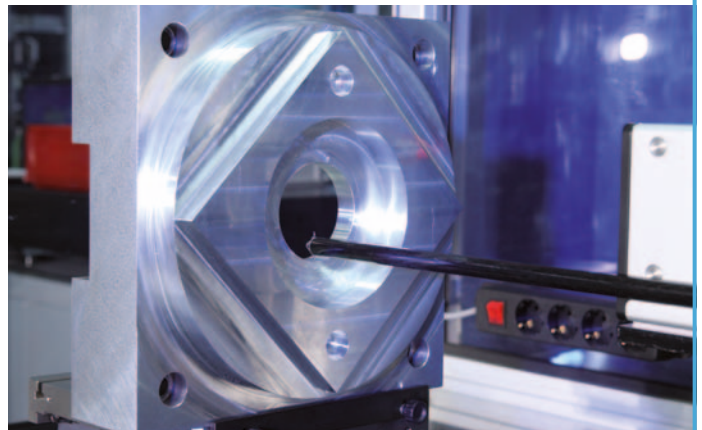
PCV collision protection order no. 7033957

350 M probe arm order no. 6851529

PCV stylus tip ±9 mm order no. 6851530

for upwards and downwards direction of measurement

CP 175 probe arm M-10/3.5 order no. 9045820



Technical data

Position path:	620 mm (lowest position approx. 110 mm above the granite plate)
Measuring path:	620 mm
Working temperature:	21°C ± 1°K ¹⁾
Accuracy:	MPE ± (2.5 +L/100) µm L = measuring length in mm ²⁾

¹⁾ A different accuracy is likely if the working temperature varies

²⁾ With probe arm ID no.: 9045820

*Position depends on country

MarSurf CNC *modular*



The MarSurf CNC **modular** measuring station configuration offers a more advanced alternative to the XC 20 CNC measuring station. It can also control automatic positioning axes. A measuring cabin is available if required. This optimizes the measuring station layout in small areas. It includes vibration absorption, a safety concept and illumination and control elements.

There is an overview of the axes available opposite. The MarSurf CNC **modular** line also offers a range of interesting and helpful components and accessory parts, such as clamping options with the clamping ball unit.

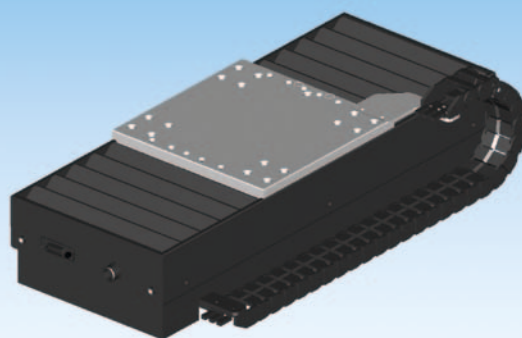
For more information and details, please see the MarSurf CNC **modular** brochure (**WebCode 20569**).

T1S-L table axis

order no.: 6710582

including control unit

Displacement path	200 mm
Dimensions (L x W x H)	510 mm x 200 mm x 200 mm
Measuring system	Encoder
Resolution	0.5 µm
Traverse path	200 mm
Speed	$v_{\max} = 30 \text{ mm/s}$, $v_{\min} = 0.2 \text{ mm/s}$
Guide deviation	0.002 mm/100 mm
Position spread	< 0.008 mm
Resolution of the measuring device	0.001 mm
Max. load	50 kg



T1S-R table axis

order no.: 6710583

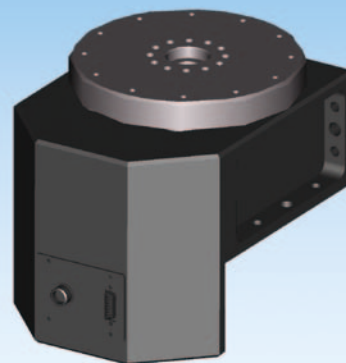
including standard support plate

order no.: 7051310

including control unit for Midrange CNC

for use as a TA-axis, TB-axis or TC-axis

Dimensions (L x W x H)	270 mm x 200 mm x 210 mm
Upper plate dimensions	Diameter 200 mm
Measuring system	Encoder
Resolution	0.5 µm
Angle of rotation	± 1000
Speed	$v_{\max} = 10^\circ/\text{s}$; $v_{\min} = 0.1^\circ/\text{s}$
Position spread	< 0.008 mm relative to a radius of 150mm
Resolution of the measuring device	0.001°
Max. load	30 kg



T3S-LLR table axis

order no.: 6710584

including standard support plate

order no.: 7051310

including control unit

Monolithic structure comprising the TX, TY and TC axes.

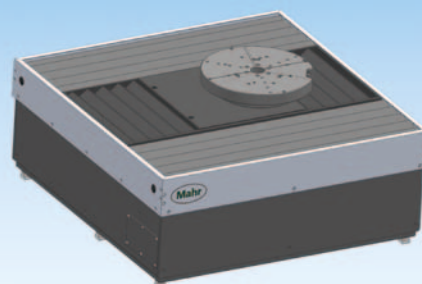
The axes are stacked as follows: TX – TY – TC

TX same as T1S-L

TY same as T1S-L

TC same as T1S-R

Max. load on TC 30 kg



MarSurf CNC modular

The chart below shows the combination options with MarSurf CNC **modular**.
The combination with the PCV drive unit is relevant when using the MarSurf XC 20 CNC.

MarSurf XR 20

Computer
Midrange CNC
XR 20 license key
MCP 21



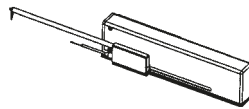
GD 120



holder

MarSurf XC 20

Computer
Midrange CNC
XC 20 license key
MCP 21



PCV



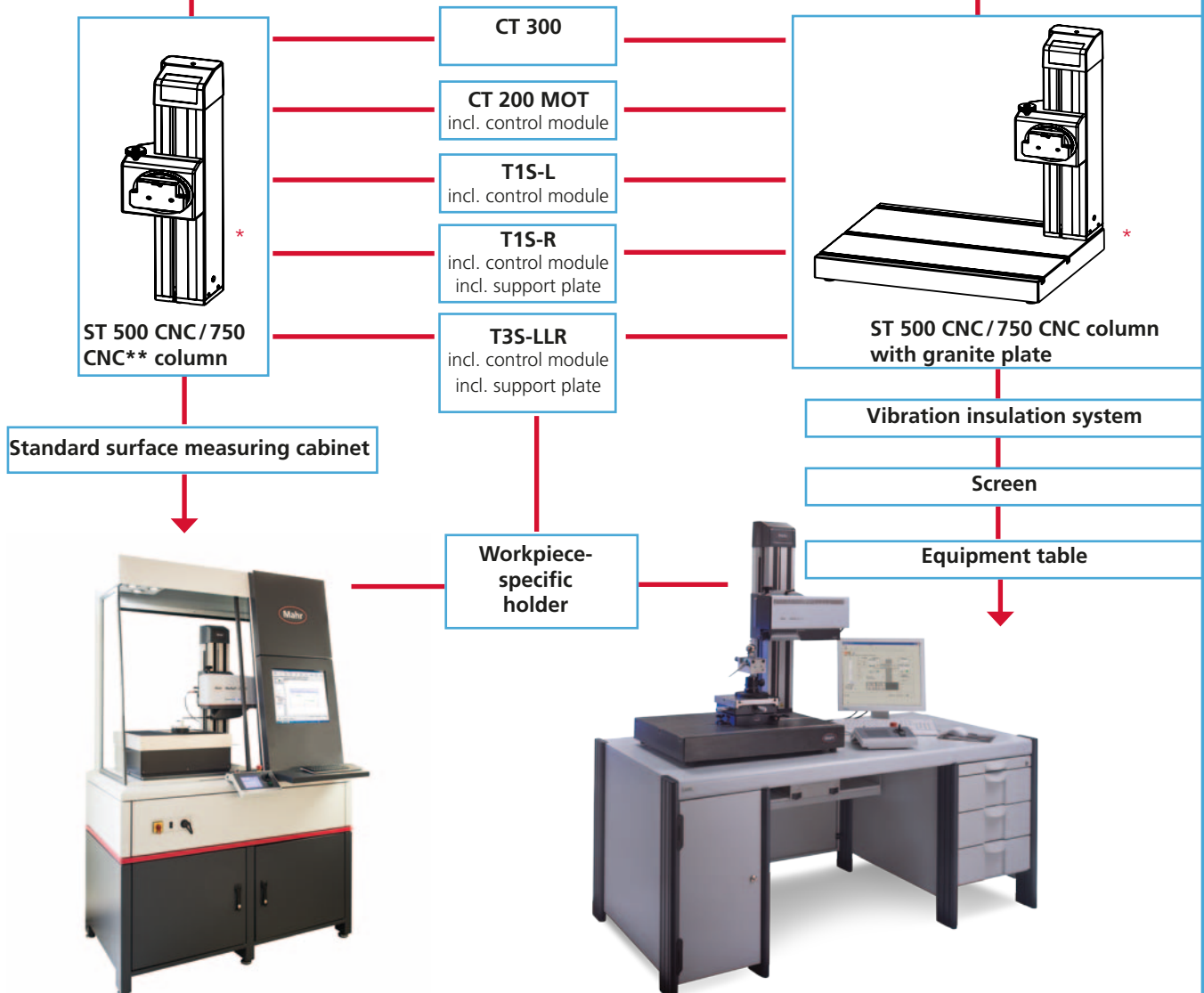
holder

MarSurf XCR 20 with LD 130/LD 260

Computer
Midrange CNC
XCR 20 license key
MCP 21



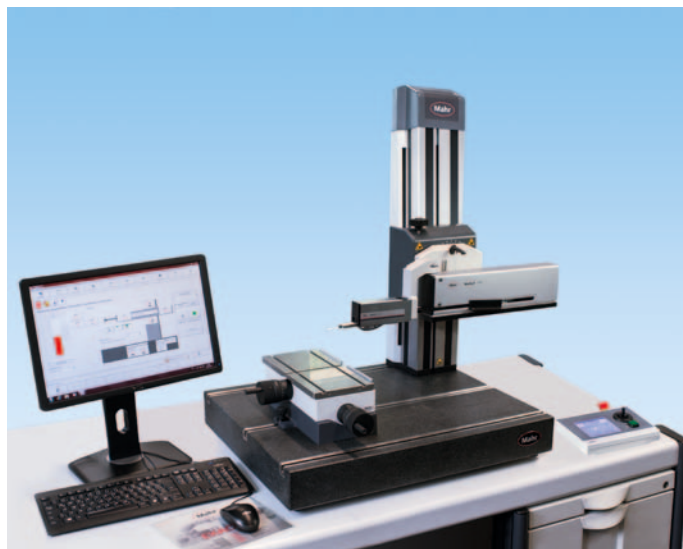
LD 130/LD 260
LD 120/UD 130



* ST 500/750 CNC (HZ/HB) not suitable for TY/TB ** with additional cover 6830232 if used with 750 mm column

Other PC-based measuring stations

Measuring station for combined measuring tasks for “contour and roughness” - MarSurf XCR 20



Description

The MarSurf XCR 20 combination measuring station is ideal for contour and roughness measurements. This measuring station comprises the PCV / CD 120 drive unit and the GD 25 roughness drive unit with the MFW 250 B probe system.

Both drive units are attached to a measuring stand (ST 500/ST 750) with a combi holder and can be used either for roughness (GD 25) or contours (PCV or CD 120). In conjunction with the XCR 20 measuring and evaluation software, this measuring station configuration can be used as a universal measuring station for roughness depth and contour measurement.

The main advantage:

One measuring station for two types of measuring task

- Uses the tried and tested PCV 200 contour drive and probe system. (as already described)
- Uses the high-precision GD 25 with MFW 250 B probe with high-resolution measuring system for roughness measurement

It is worth noting that this combi measuring station can also be retrofitted to XC 20 configurations. In other words, your XC 20 measuring station can easily be upgraded to a combi measuring station if necessary with the PCV / CD 120 drive unit. Simply add the GD 25 drive unit and the combi holder. A software upgrade from XC 20 to XCR 20 is required.

Further information can be found on our website under **WebCode 20561**.

Measuring station components

Examples

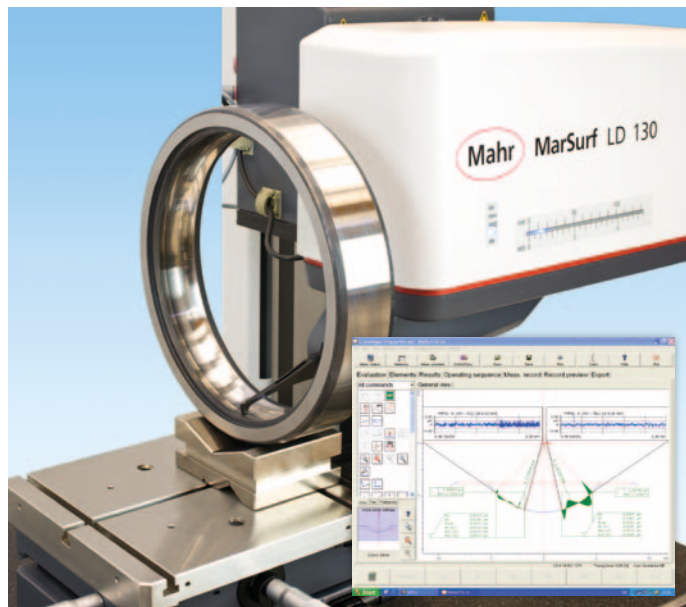
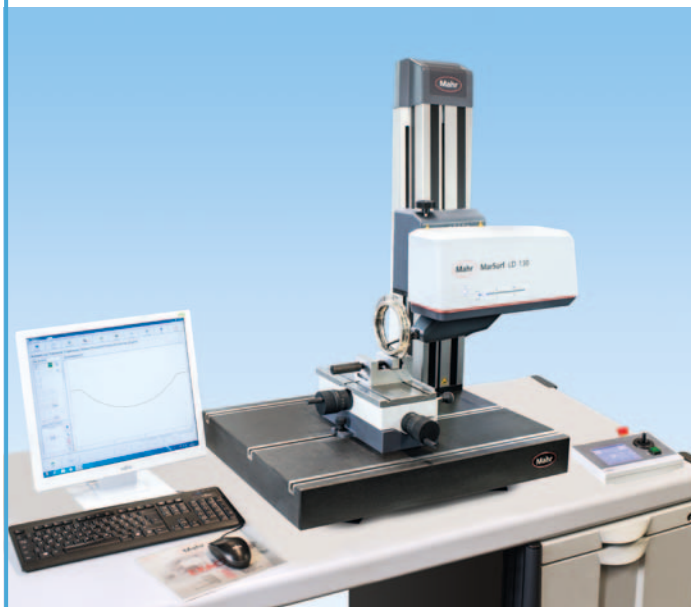
MarSurf XCR 20 **order no. 6268383**
including Midrange standard control unit, XCR 20 software, Mahr license key

MarWin PC*	order no. 9xxxxxx
TFT 24" monitor	order no. 3027221
MCP 21 manual control panel	order no. 7033935
GD 25 drive unit	order no. 6721006
MFW 250 B probe system set	order no. 6111406
PCV 200 drive unit	order no. 6720810
Standard contour calibration set	order no. 6820124
ST-500 measuring stand	order no. 6710250
Combi holder for GD 25 and PCV	order no. 6851349
CT 300 XY table	order no. 6710549

Optional: **order no. 6710604**
PPS parallel vise

Other PC-based measuring stations

Measure two parameters in one go – MarSurf LD 130, LD 260 or UD 130



Description

This measuring station is one of the best surface and contour measuring instruments in the world. The optical converter system enables a high profile resolution, even at measuring strokes of up to 13 mm or 26 mm. This means that contour evaluations can be performed on this measuring station to the highest precision requirements with parallel roughness depth evaluation.

There are three versions available depending on the dimensions and precision requirements:

- MarSurf LD 130 with a measuring stroke of 13 mm (26 mm with 200 mm probe arm), measuring length 130 mm
- MarSurf UD130 with a measuring stroke of 13 mm, measuring length 130 mm
- MarSurf LD 260 with a measuring stroke of 13 mm (26 mm with 200 mm probe arm), measuring length 260 mm

For more detailed information please see the separate MarSurf LD 130/260 brochure and **WebCode 20560** and MarSurf UD 130 flyer and **WebCode 20808**.

Measuring station components

Examples for a MarSurf LD 130 measuring station

MarSurf XCR 20 CNC	order no. 6268385
including Midrange CNC control unit, XCR 20 software, Mahr license key	
MarWin PC*	order no. 9xxxxxx
TFT 24" monitor	order no. 3027221
MCP 21 manual control panel	order no. 7033935
LD 130 drive unit	order no. 6720821
including probe system and accessories	
Contour 1 calibration set	order no. 6820121
with 2 balls (45 mm 4 mm) accuracy class 1	
ST-500 CNC measuring stand	order no. 6710254
incl. granite plate 700 x 550 mm	
incl. Hz control module	
CT 300 XY table	order no. 6710549
Damping elements set	order no. 6851399
Optional:	
PPS parallel vise	order no. 6710604

*Position depends on country, PC according to operating system and language

Other PC-based measuring stations from the MarSurf range

MarSurf XR 20 roughness measuring station



Description

The MarSurf XR 20 is the perfect introduction to Mahr's cutting-edge surface metrology. This PC-based instrument delivers all common surface parameters and profiles in accordance with international standards, both in the measuring room and in production areas.

Clearly laid-out icons and convenient user-friendly help make this high-performance product easy to handle.

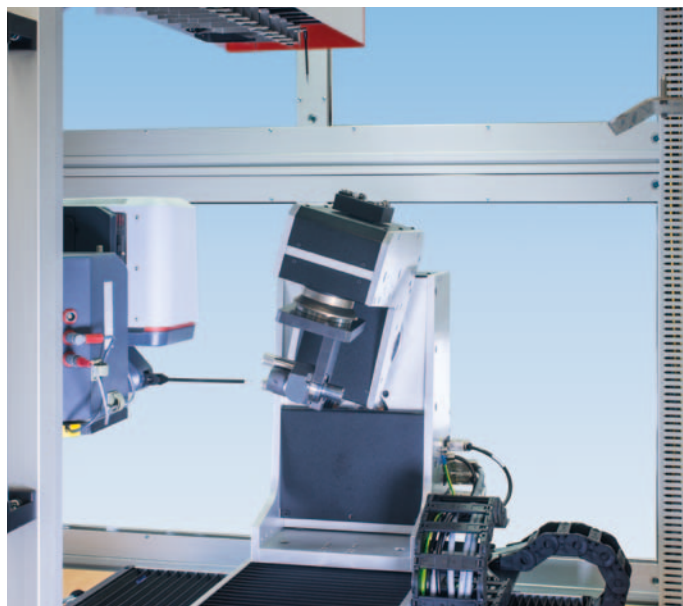
It uses MarWin-based software, just like the MarSurf XC 2 / XC 20.

The MFW 250 B probe system is just one of its excellent advantages as it features a magnetic probe arm holder. This means that the probe arm can be changed in seconds without any additional tools, and the probe arm is protected from damage in the event of a collision.

There is a variety of probe arms available for a wide range of measuring tasks.

Further information can be found on our website under **WebCode 20554**.

MarSurf CNC *premium* customized surface measuring stations



Description

The MarSurf CNC *premium* range is available for special surface measurements that are often integrated in the manufacturing process. Tried and tested standard components such as drive units, probe systems and measuring stands are incorporated into an intelligent coordinated measuring station configuration.

In order to ensure a fast and customer-oriented process even for these customized measuring stations, we have developed a concept from several basic types geared towards the size of the measuring positions, the workpiece types, measuring time requirements and the level of automation required.

Essential components such as automatic workpiece feeders, measuring cabinets with vibration-cushioned table constructions, and integrated safety systems are just a few examples. The patented probe arm changer for measuring stations with the MarSurf LD 130 / LD 260 drive unit is outstanding. This component can automatically change up to 10 different probe arms according to the measuring program in an automated process. As a result, the machine does not have to be stopped, which means substantial time and cost savings. For many years, Mahr has been the only manufacturer of surface and contour measuring instruments in the world to have successfully implemented this solution.

Further information can be found on our website under **WebCode 20568**.

MarWin software for MarSurf XC 2/XC 20

MarWin-Based Software – User Benefits

Description

Apart from the high-precision mechanical and electrical components of the XC 20 measuring station, software is becoming an increasingly important factor.

Today's challenges, in an age of increasingly rapid technological advancement, demand immense flexibility, high performance and, at the same time, ease of use. Different user rights can be selected to ensure a high level of security.

The MarWin platform provides an excellent basis for working with virtually all Mahr products from the systems range.

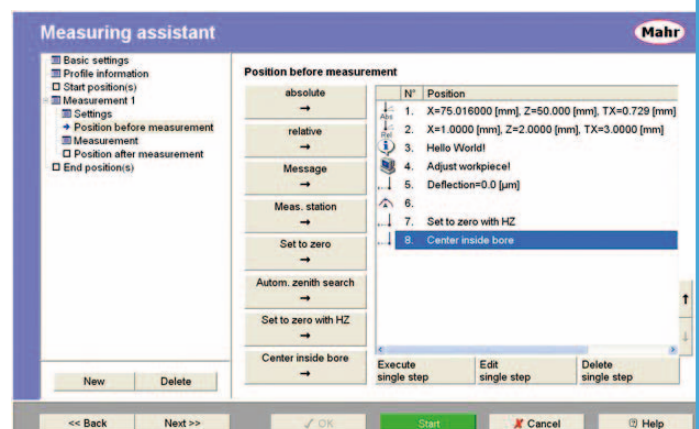
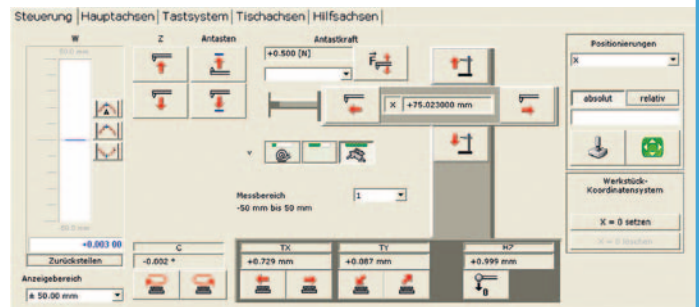
You can keep your software up to date with regular upgrades. A wide range of software options allow you to access new features as well as special evaluation and measuring methods.

Easy to use thanks to its logical, clear user interface.

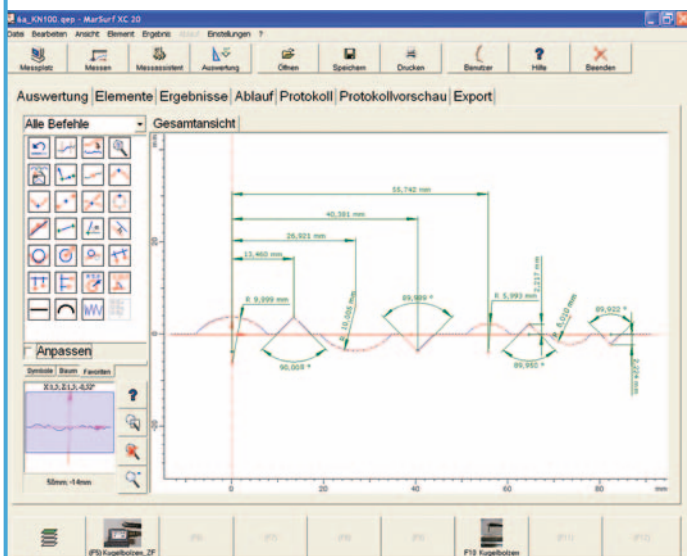
One major factor is that the user guide is made as self-explanatory as possible. The MarWin software guides the user with symbols and clear icons as shown in the picture of the measuring station opposite.

It includes essential information about the measuring station components and the probe calibration and position.

The “measuring assistant” screen makes the software particularly user-friendly. This is where you can enter all the relevant parameters of the measurement such as positioning information, start positions, measuring conditions, multiple measurements, direction of measurement, measuring force, operating instructions during a measuring routine etc.

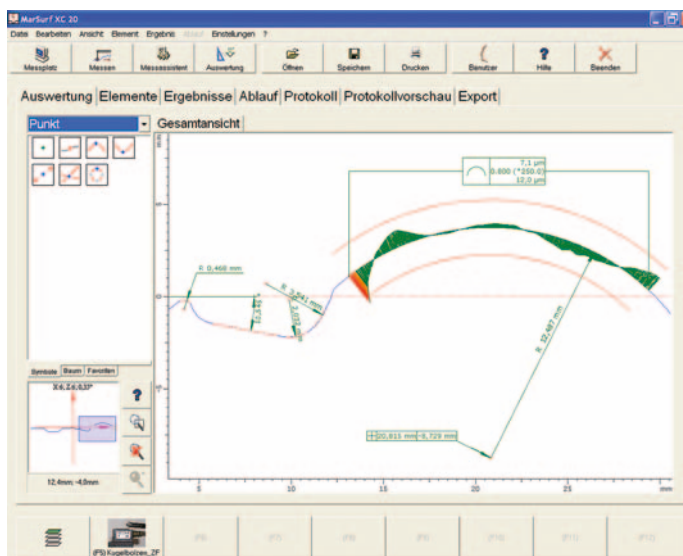


MarWin software for MarSurf XC 2 / XC 20



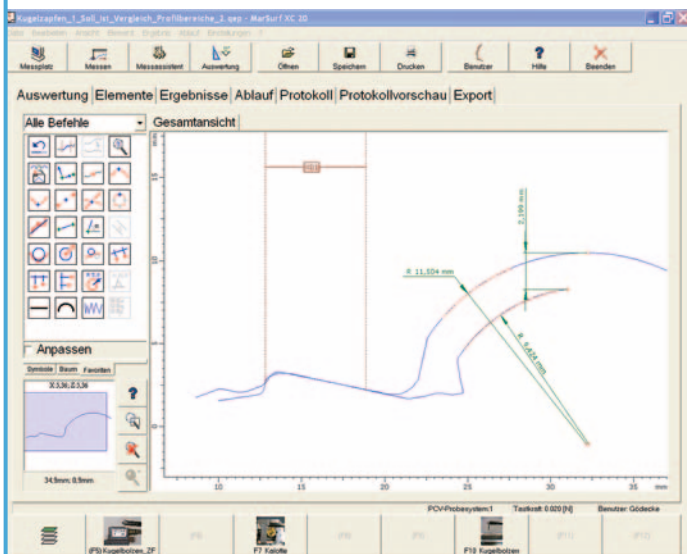
Standard evaluation

Quick and easy evaluation of basic geometric elements such as radii, angles and distances to coordinate axes is effortless thanks to the tools in the action box.



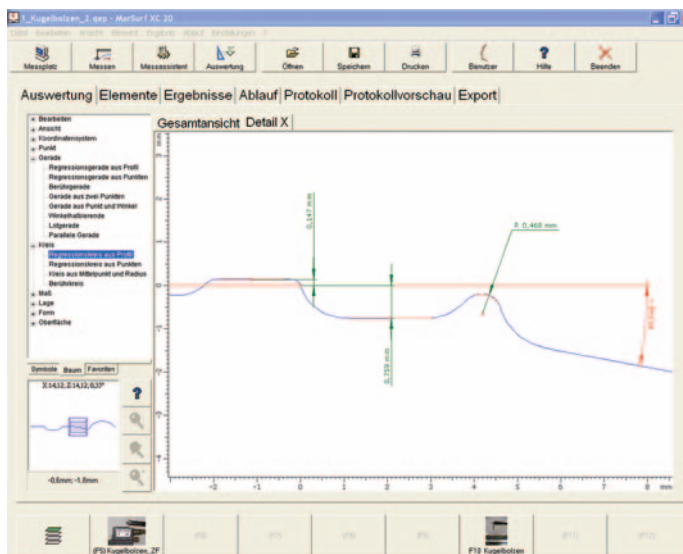
Line form evaluation

Deviations between the actual geometry and the reference geometry are shown in a graph highlighting the maximum deviation. The preselected tolerance band shows at a glance whether or not the workpiece is within or outside the tolerance.



Nominal/actual comparison

Comparing the actual profile to a reference profile is one of the challenges of contour evaluation. In the example shown above, best-fit is performed in the specific profile section. It is now possible to determine the measurement variances, which in this case indicate the wear of the tool.



Creating auxiliary references

Many technical drawings of workpieces contain dimensions whose reference is not in a visible edge, but in an auxiliary element. This example shows how a parallel line is created to a workpiece edge.

MarWin software for MarSurf XC 2/XC 20

When it comes to contour measurements and their results, the corresponding measuring and evaluation strategies are key. The software module “**Tangential elements**” offers a unique evaluation on profile transitions of geometric forms such as straight line to radius. This evaluation defines three main features:

- Tangential circle
- Tangential straight line
- Tangential transition

This software module guarantees that if a correct evaluation has been made at transitions between two profile elements, e.g. radius to straight line, an intersection point will **always** be found. This function is a standard feature of MarSurf XC 20. This software module is available as an option for MarSurf XC 2.

Tangential elements

The function is divided into different areas, with three distinct basic cases:

• Tangential circle

The tangential circle is a best-fit circle, which always forms a touch point with the reference straight line. Examples here include transition radii and recesses. The function can be used with one or two reference straight lines.

• Tangential straight line

The tangential straight line is a best-fit straight line which always forms a touch point with the reference circle. Example: Straight lines on chamfers.

• Tangential transition

The tangential transition joins a best-fit circle and one or two best-fit straight lines to form a continuous contour element. This allows a seamless line form evaluation between the elements without it jumping. Examples: edges with small radii, transition radii, recesses, etc.

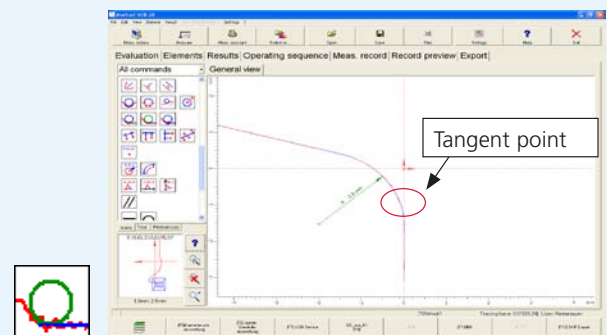
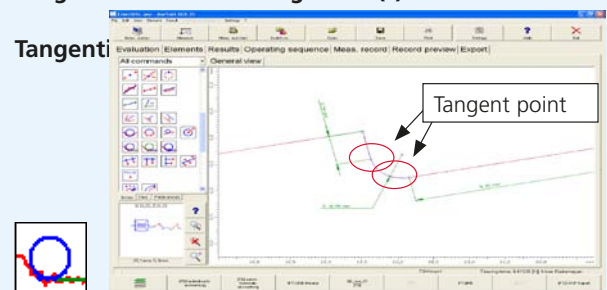
Optional: Tangential elements

The “Tangential elements” function is optional with MarSurf XC 2. ID no. 6292276

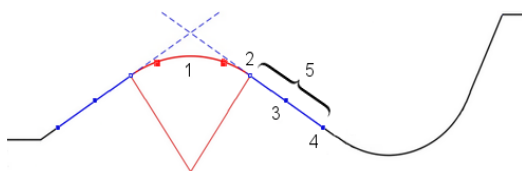
Tangential circle or tangential straight line

Tangential circle on straight line(s)

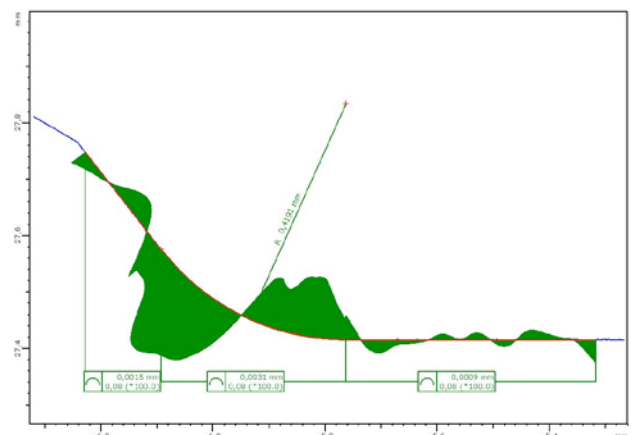
Tangenti



Tangential transition



- 1 = Tangential circle
- 2 = Calculated start point of the datum straight line
(Contact point between the tangential circle and the datum straight line)
- 3 = Defined start point of the datum straight line
- 4 = Defined end point of the datum straight line
- 5 = Calculated datum straight line



MarWin Software – Options

Thread measurement option

The quality testing of threads by way of attributive testing with thread gages is inadequate for many components.

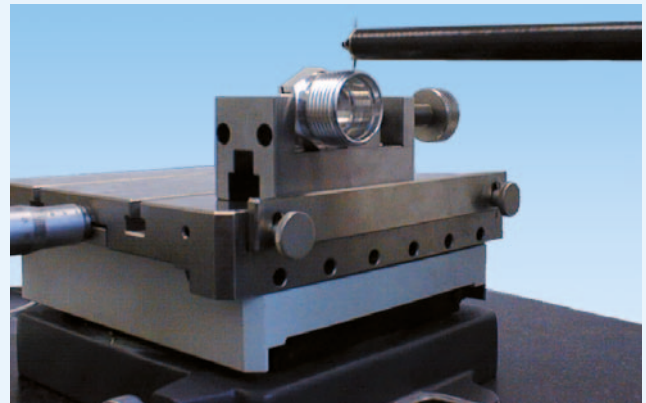
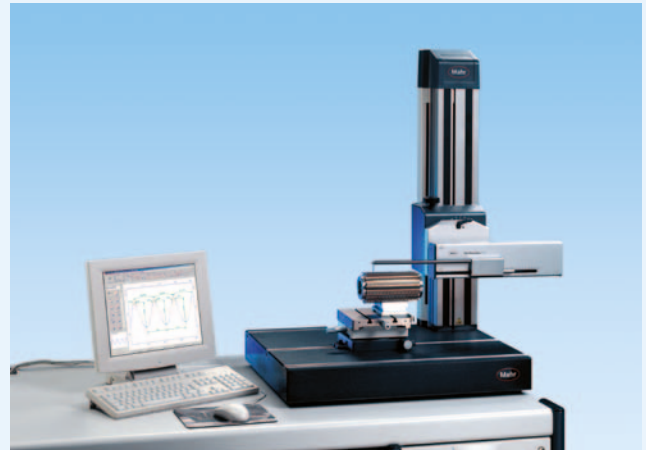
As soon as it comes to reference masses for further contour elements or even dimensions of thread parameters, testing by measurement is essential.

The MarSurf XC 20 contour measuring station in conjunction with the probe arm with double stylus and the “thread measurement” software option can perform complete thread measurements and evaluations quickly and easily.

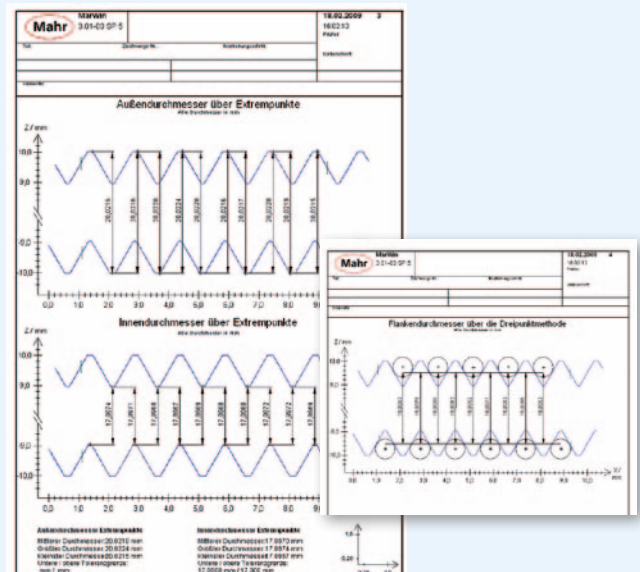
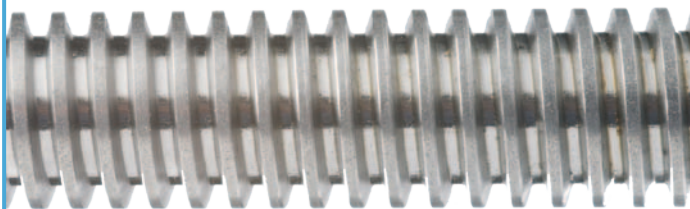
Advantages:

- Diameters can also be measured when using a double stylus
- Evaluation of inner, outer and pitch diameters
- Three-wire method of evaluation
- Measurement of straightness of flanks
- Pitch measurement
- Measurement of different profile forms
- Interchangeable probe arms according to measuring task
- Magnetic holder, no recalibration required when changing probe arm
- Diameters of up to 620 mm can be measured when using the MarSurf ST 750 D measuring stand
- All other contour measuring tasks can be performed with this universal instrument

Measurement on workpiece threads



Measuring the outer thread of a socket with the MarSurf XC 20 contour measuring system



MarSurf XC 2 / XC 20 Calibration

Calibration: The basis for the right results!

An intelligent calibration system performs measurements with μm accuracy. The main features include geometry calibration and bend and measuring force calibration. A user-friendly measuring program guides the user through the calibration steps quickly and easily. Once a probe arm has been calibrated, the data is saved so that each probe arm only needs to be calibrated once when being changed.

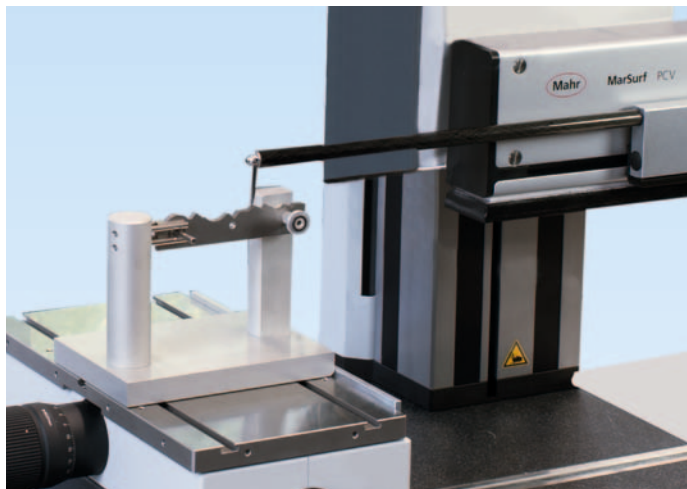
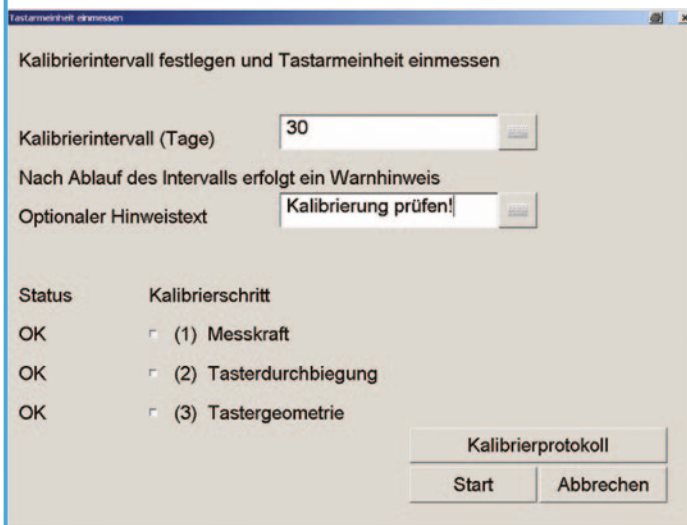
This standard is suitable for calibrating the twin stylus probe too.

Even during calibration the scaling is permanently adjusted and residual errors documented. In this way, dirt and damage to the probe arm can be identified early on. If tolerances are exceeded, the actual value and the tolerance are displayed.

Residual errors **before and after** correction of the residual error are documented.



Calibration standard contour 1 for MarSurf LD systems
order no. 6820121



Contour standard KN 100
order no. 6820125

One of the major advantages of the probes for the MarSurf CD 120, PCV 200, LD 130/260, UD 130 drive units is that they can be changed without a tool thanks to the magnetic holder. This allows you to fit the right probe for different measuring tasks quickly and easily.

The calibration menu allows you to calibrate every probe and save the calibration data. Each probe arm only has to be calibrated once. You do not have to recalibrate the probes each time they are changed.

Contour standard KN 100 is used to carry out a practical check of the measuring station.

It contains the main geometrical elements. KN 100 can be supplied with a DKD certificate or Mahr certificate on request.

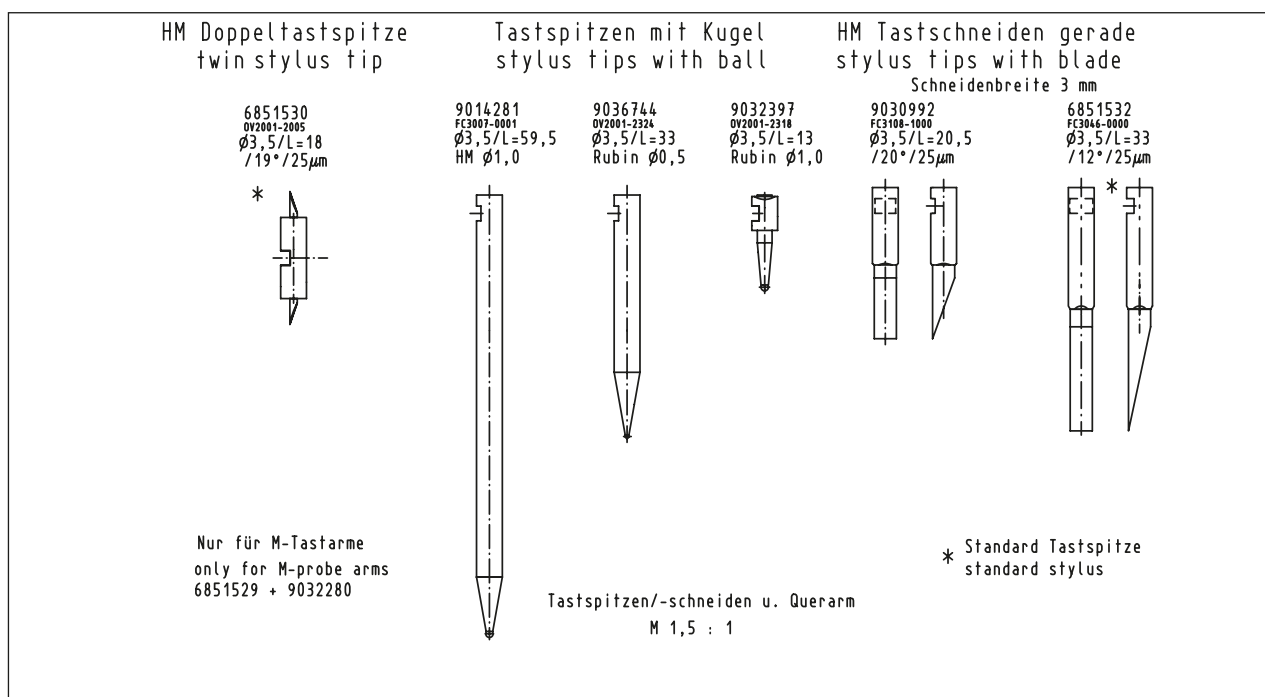
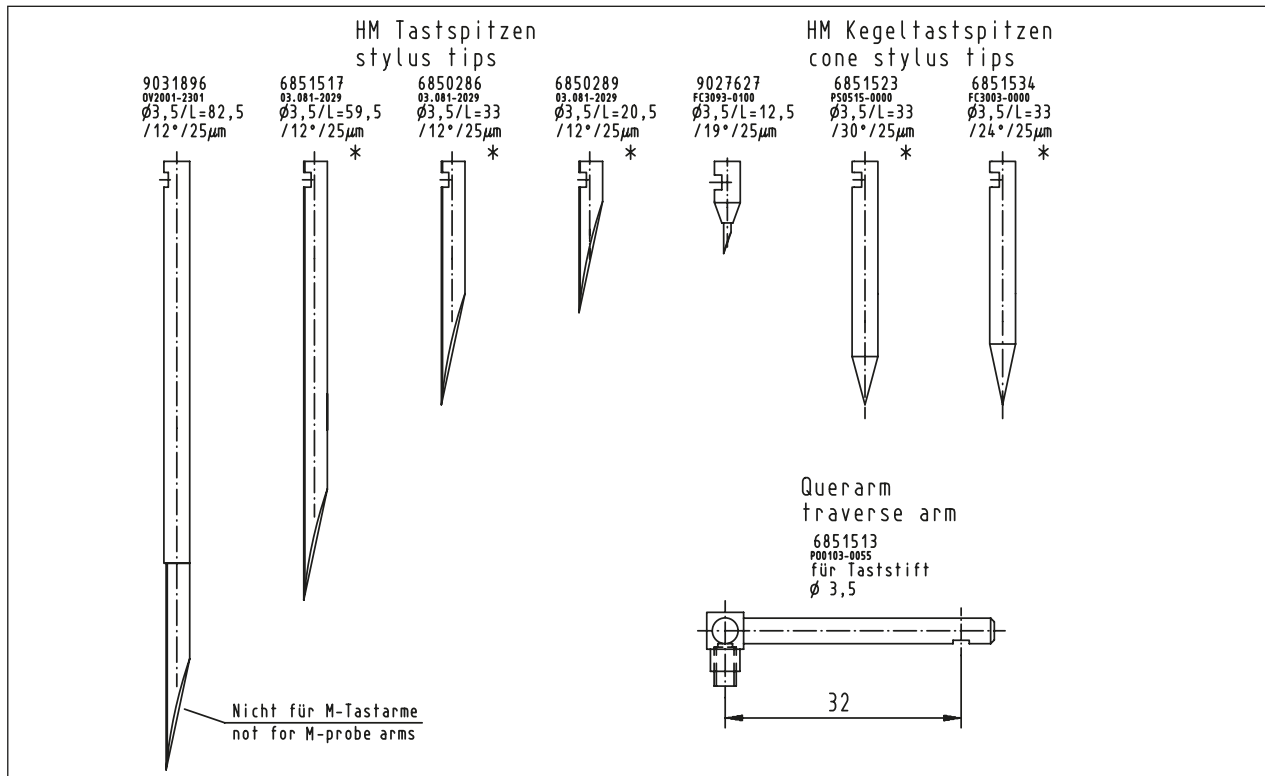
DAkS/DKD calibration for KN 100
Mahr calibration for KN 100

order no. 6980110
order no. 9964316

MarSurf XC 2 / XC 20. Contour probes and stylus tips

Stylus tips and probe arms for your measuring tasks

The range of probe arms and stylus tips available shows the flexibility of Mahr's contour metrology. Suitable probe arms and stylus tips have been developed for almost all measuring tasks as a result of the myriad of applications over the years. That's why we have the solution to your measuring task.



MarSurf XC 2 / XC 20. Contour probes and stylus tips

Stylus tip sets for your requirements

To ensure that your workpieces are of the right quality, you need to be able to rely on the contour measurement results! Mahr's stylus tip sets offer excellent value for money on original stylus tips.

You can save time and money by buying a set of standard stylus tips.

1. Set 6851560

consisting of:

2x clear box each with 3x stylus tips, length 33 mm

2. Set 6851561

consisting of:

2x clear box each with 3x stylus tips, length 59.5 mm

3. Set 6851562

consisting of:

1x clear box each with 3x stylus tips, length 59.5 mm and

1x clear box each with 3x stylus tips, length 33 mm



For re-order

Only with original Mahr stylus tips can you be certain of getting the right contour measurement results. Only original stylus tips with the Mahr logo guarantee reliable contour measurements.



Clear box with 3x stylus tips,
length 33 mm



Clear box with 3x stylus tips,
length 59.5 mm



Clear box with 3x stylus tips,
length 20.5 mm

Other stylus tips and probe arms are pictured in the list below **(WebCode 11160)** .

MarSurf XC 2/XC 20. Contour probes and stylus tips

Probe arm insert 175-M/8 order no. 6851527

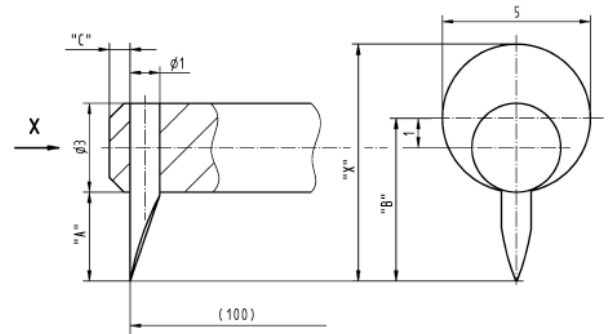
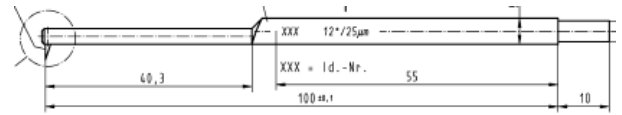
Total length of probe arm insert: 110 mm
 Length to probe arm holder: 100 mm
 Length of stylus tip beneath probe arm: 3 mm

Stylus tip radius and diameter: 25 μm /1.0 mm
 Cone angle: 19°
 Material: Carbide

Can be used for:
 Holes \varnothing 8 mm ("X") to measuring depth 100 mm
 Holes \varnothing 6 mm to measuring depth 40.3 mm
 Length of stylus tip beneath probe arm ("A"): 3.0 mm

Stylus tip comes with the PCV 200 and CD 120 drive units as standard

The stylus tip requires a probe arm holder order no. 6851528



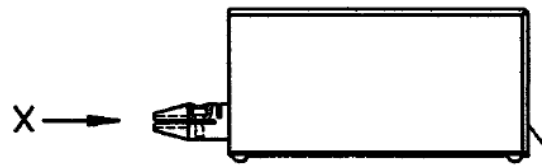
Probe arm holder 175-M order no. 6851528

Total length of probe arm holder: 125.0 mm
 Length from probe arm clamp to holder: 25.0 mm

Material: Aluminum

Probe arm holder comes with the PCV 200 and CD 120 drive units as standard

The probe arm holder forms the basis of the 175-M probe arms; it cannot be used without stylus tip order no. 6851527.



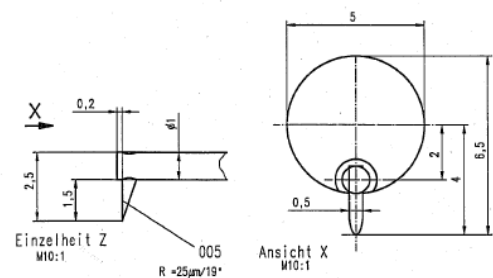
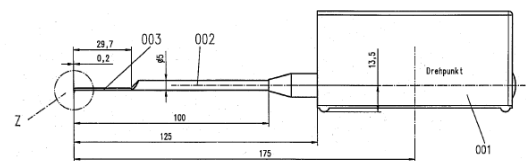
CP probe arm 175-M/6.5/2.5/1.5 order no. 6851547

Total length of probe arm: 225 mm
 Distance between contact point and center of rotation: 175 mm
 Total length to probe arm holder: 100 mm
 Diameter of probe arm: 5.0 mm

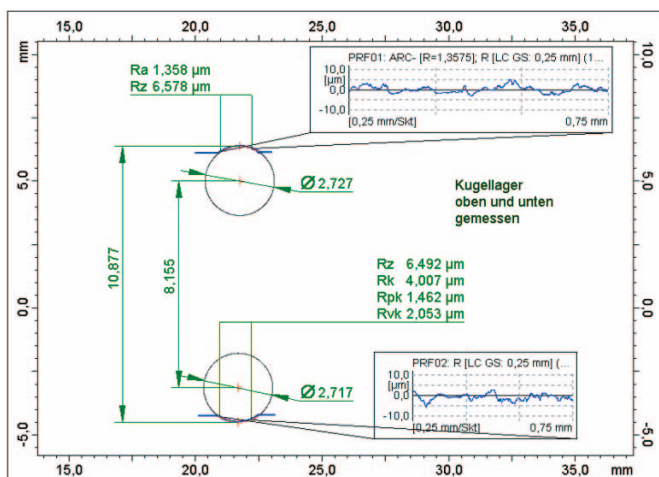
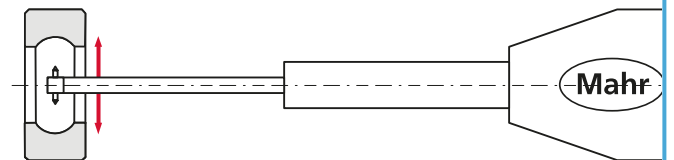
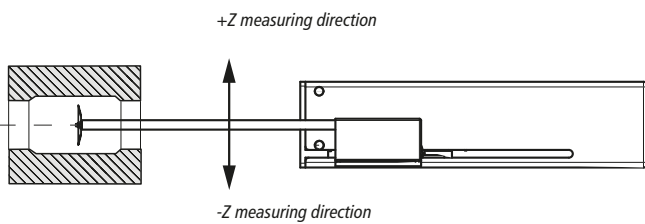
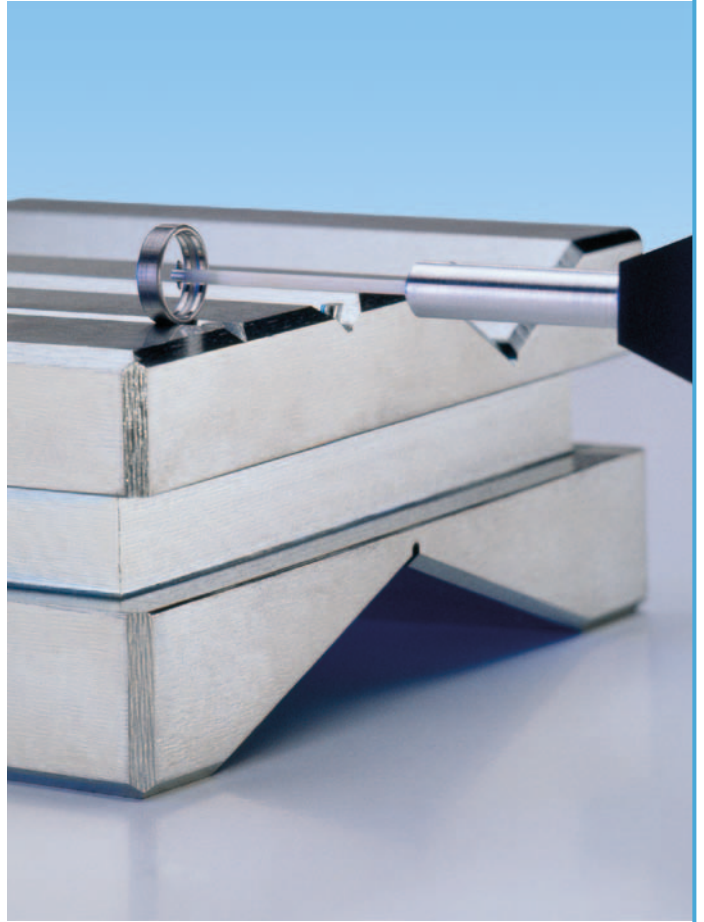
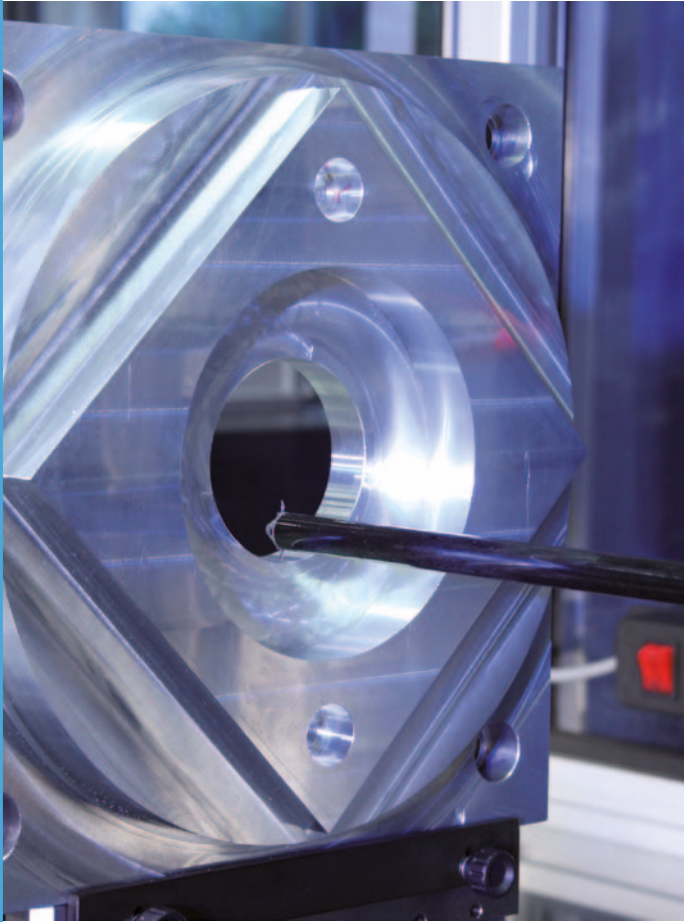
Stylus tip radius and diameter: 25 μm / 0.5 mm
 Cone angle: 19°
 Material: Carbide

Can be used for:
 Holes \varnothing 6.5 mm to measuring depth 100.0 mm
 Holes \varnothing 2.5 mm to measuring depth 29.7 mm
 Length of stylus tip beneath probe arm: 1.5 mm

Probe arm comes complete with probe arm holder



Measuring with the Twin Stylus Probe



Measuring "top and bottom" contours

Many workpiece geometries require contour measurements in opposite directions.

The MarSurf XC 20 and PCV 200 and LD 130/LD 260/UD 130 drive units offer an exemplary way of performing this measuring task.

The following features are essential for this challenging measuring task:

- Measuring force switch
- Calibration of a twin stylus probe
- Saving multiple profiles
- Evaluating multiple profiles

Some application examples

With our extensive range of probe systems you are always well equipped for your applications.

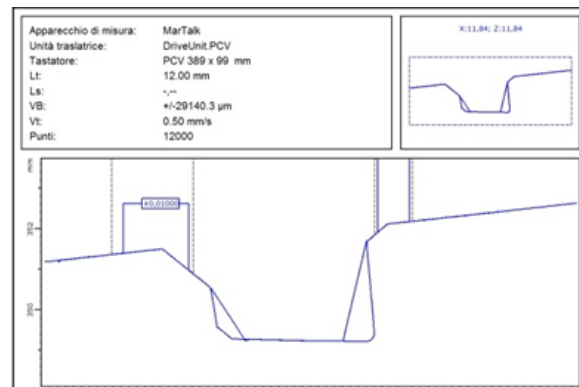


Automotive industry - crankshaft measurement

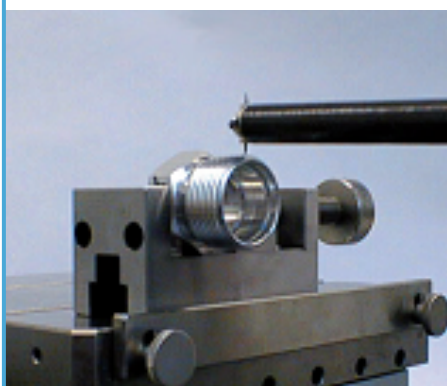


Application examples

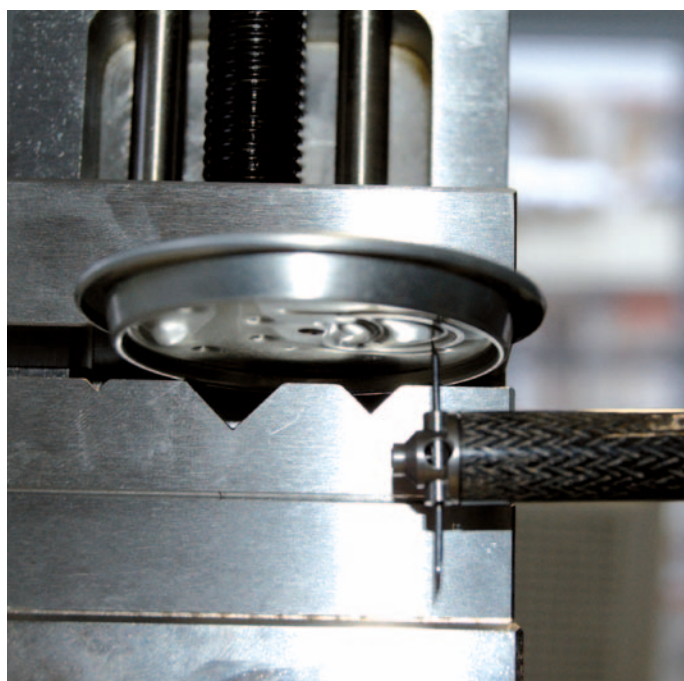
Automotive industry – contour measurement on brake caliper



Mechanical engineering industry – thread measurement



Mechanical engineering industry – container measurement

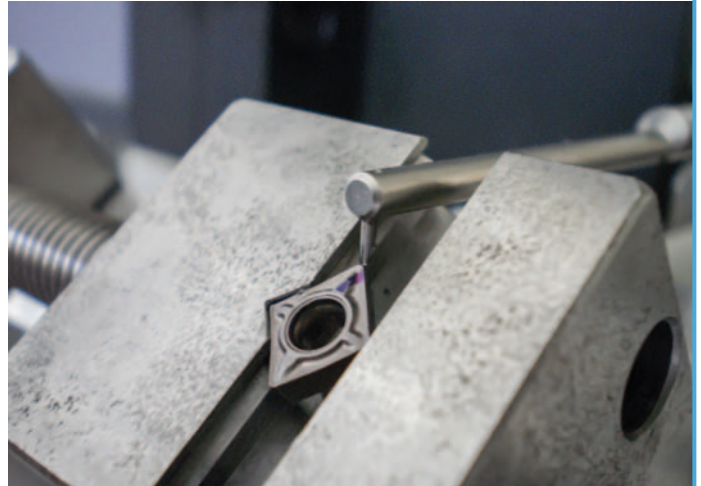


Application examples

Mechanical engineering industry – Tool measurement

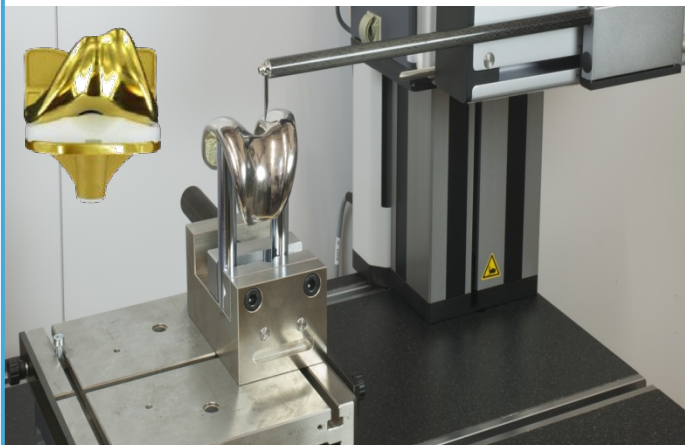


Angle measurement of a drilling surface

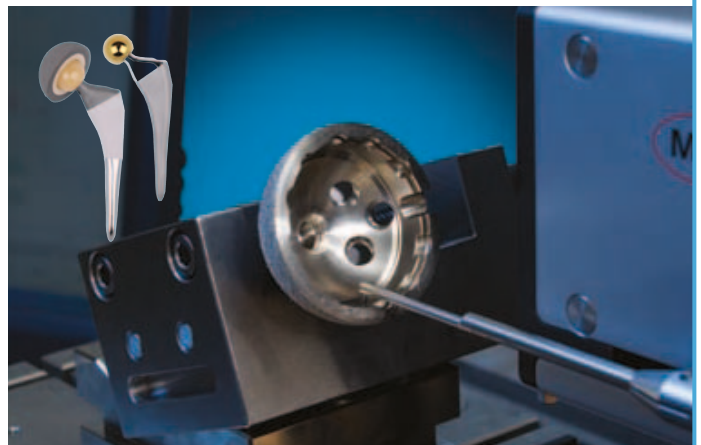


Angle measurement of an indexable insert

Medical industry – Measuring an endoprosthesis

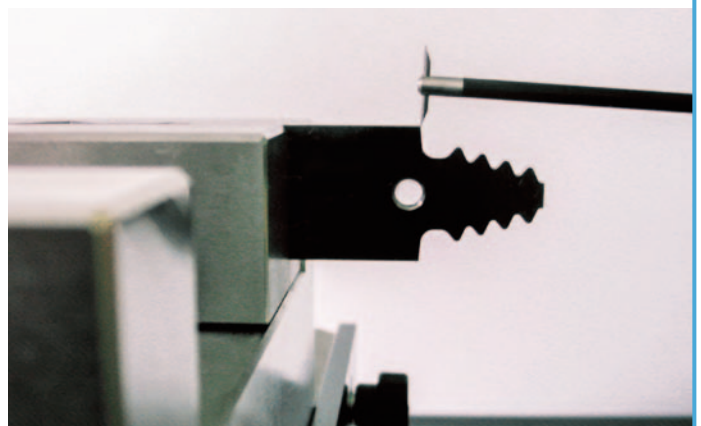


Measuring a knee endoprosthesis



Measuring a ball socket for a hip joint endoprosthesis

Aerospace industry – Measuring a “fir tree profile”



MarSurf ST 500 / ST 750 / ST 500 CNC / ST 750 CNC



Description

The MarSurf ST 500, ST 750 and ST 750 CNC measuring stand family provides the essential components for an optimal surface measuring station. Decades of experience in the area of surface metrology, together with our core expertise in vibration, smoothness and mitigating environmental influences, have been poured into this new concept to provide you with the perfect conditions for a high-quality surface measuring station for roughness and contours.

- Simple clamping of accessory components with 10 mm chip flute set
- Easy assembly. Fast clamping thanks to an eccentric clamping mechanism
- 60 mm adjustment in Y direction (of column)

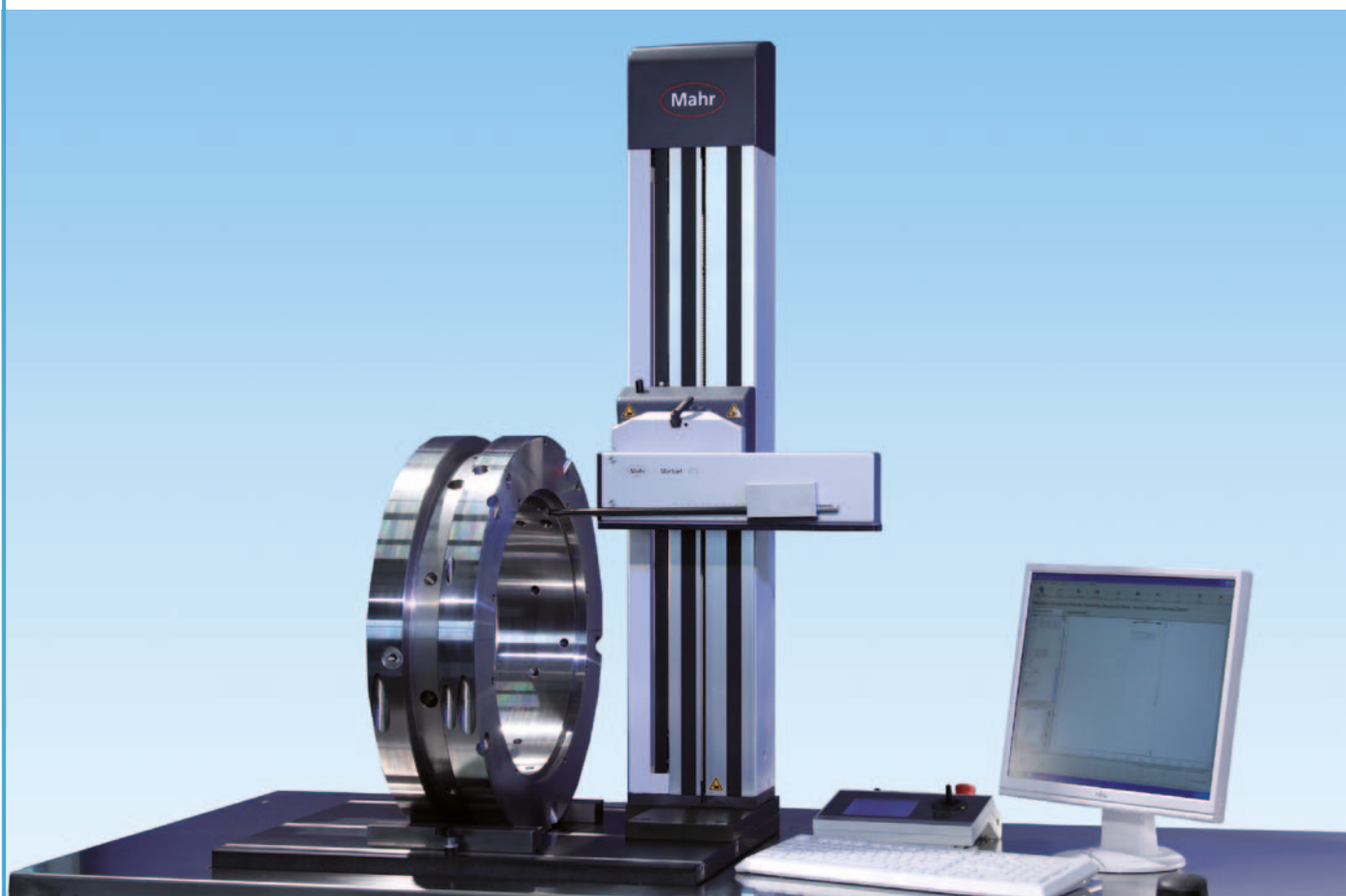
Optional:

- Damping element set for absorbing environmental vibrations
- A central air supply point allows controlled filling and topping up of the damping elements
- Pressure control for damping set order no. 6851399

Measuring stand combinations

ST 500 complete incl. granite plate, 500 mm traverse path Plate size in mm 700 x 550 x 90	order no. 6710250
ST 500 column	order no. 6851350
ST 750 complete incl. granite plate, 750 mm traverse path Plate size in mm 700 x 550 x 90	order no. 6710251
ST 750 column	order no. 6851351
Granite plate Plate size in mm 1000 x 550 x 90	order no. 6710580
ST 500 CNC / HZ column	order no. 6851392
ST 500 CNC / HZ+HB column	order no. 6851393
PCV collision protection	order no. 7033957
PCV/CD 120 holder	order no. 6851362
Combi holder PCV/GD 25	order no. 6851349

ST 750 D measuring stand



Description

As explained on page 13, this measuring stand is ideal for measuring large dimensions in the vertical range. Together with the PCV/CD 120 drive unit or the LD 130/260 system and the double stylus, the 620 mm traverse path can be used which means that verticals (diameters) can be calculated too.

MarSurf. Damping set (not pictured)

Damping set for measuring objects up to 100 kg.

The MarSurf damping set 1 consists of:

- 4 air spring components
- Supply line kit
- Air pump (with gage)

Load: 20 kg up to 60 kg x 4 = 80 kg up to 240 kg
Granite plate + column weight: 80 kg + 50 kg = 130 kg
 Max. permitted weight of workpiece: approx. 100 kg

order no. 6851399

Optional: Pressure control for damping set 6851399

ST 750 D measuring stand

ST 750 D measuring stand
Control module
Holder
PCV collision protection

order no.: 6710255
order no.: 6851389
order no.: 6851362
order no.: 7033957

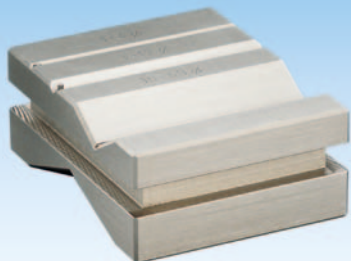
Manual control panels

MCP 23 **order no. 7035195**
 with **emergency stop** function and enable button

MCP 21 **order no. 7039135**
 with **emergency stop** function and enable button as well as touchscreen and joystick



Accessories



PP vee-block order no. 6710401

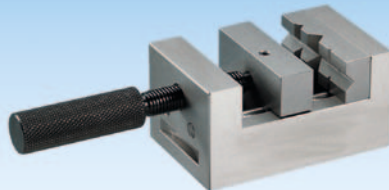
with four different vee-blocks for holding turned parts for testing diameters from 1 mm to 160 mm.

Dimensions

80 mm x 100 mm x 40 mm

Weight 1.5 kg

Incl. tension springs for clamping light measuring objects in the vee-block



PPS parallel vise order no. 6710604

for clamping measuring objects.

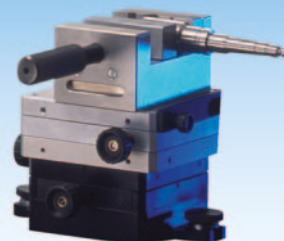
Jaw width 70 mm

Jaw height 25 mm

Measuring span 40 mm

Total height 58 mm

Weight 2 kg



XY table CT 120 order no. 6710529

for holding and aligning measuring objects. Can be moved 15 mm in two coordinates.

Table surface: 120 mm x 120 mm, with two quick clamping shoes

Optional: Rotary attachment for CT 120
order no. 6710547



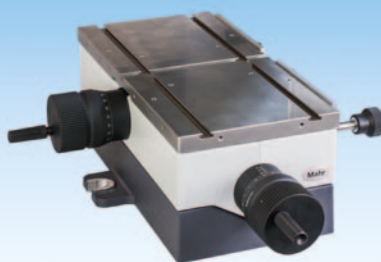
PKS sphere joint vise order no. 6710610

Based on the PPS parallel vise above.

The ball joint can be sensitively tilted in any direction and rotated 360°.

Total height: 150 mm

Weight: 3.5 kg



XY table CT 300 order no.: 6710549

Dimensions incl. micrometer screws
410 mm x 300 mm x 120 mm

Weight approx. 15 kg
max. load 90 kg

Table plate (end face)
300 mm x 150 mm

Travel distance of micrometer screws
Tx and Ty 25 mm each

Rotation in the X-Y plane $\pm 4^\circ$
(screw Tc)

Guide deviation max. 2.5 μ m

1 T-groove Tx-direction

2 T-grooves Ty-direction

8 threaded holes M5

4 hold-down devices of length 60 mm

2 stop bars 120 mm x 15 mm

Grooving blocks for T-grooves
in the table plate T unit 15/M5/3.5



Equipment table order no. 6830139

Dimensions (L x W x H)
1710 mm x 870 mm x 750 mm.
Max. load capacity: 250 kg.



Standard measuring cabinet order no. 6830231

Good reasons for choosing the MarSurf XC 2/XC 20



Guaranteed success with MarSurf XC 2, MarSurf XC 20 because ...

- You're measuring with experience:** Decades of experience in contour metrology have gone into this measuring station concept. This is particularly significant with regard to coordinating the calibration procedure scanning principle and the evaluation strategy
- You're measuring with safety built in:** The magnetic probe arm holder prevents the probe arm from getting damaged or broken
- You're measuring with flexibility:** A range of probe arms and stylus tips is available for your measuring task
- You're looking ahead:** The MarWin-based software is the perfect medium that leaves nothing to be desired, from user guidance to the range of evaluation and performance. Pioneering evaluation strategies such as those used in "Tangential elements" confirm that:
- You are always one step ahead with Mahr**

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Mahr

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We reserve the right to modify our products, especially in light of technical improvements and further developments. All illustrations, numerical values etc. are therefore subject to change.