



## Contact and optical sensors

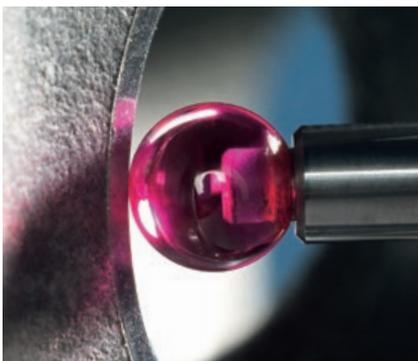
A 360 degree view



## Bright prospects with sensors from ZEISS

The product line of ZEISS Industrial Metrology – the technology leader – is extremely versatile and includes coordinate measuring machines, sensors, software, technical service, comprehensive customer services and support. ZEISS sets the standard not only for measuring machines, but also for sensors. They meet the increasing expectations on quality and flexibility. For premium measuring performance and peak productivity.

Whatever your needs – active or passive, optical or contact, touch-trigger or scanning – the world of sensors from ZEISS has the solution.





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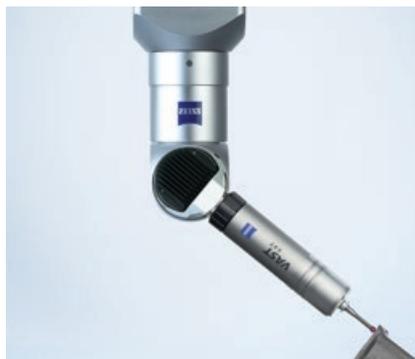
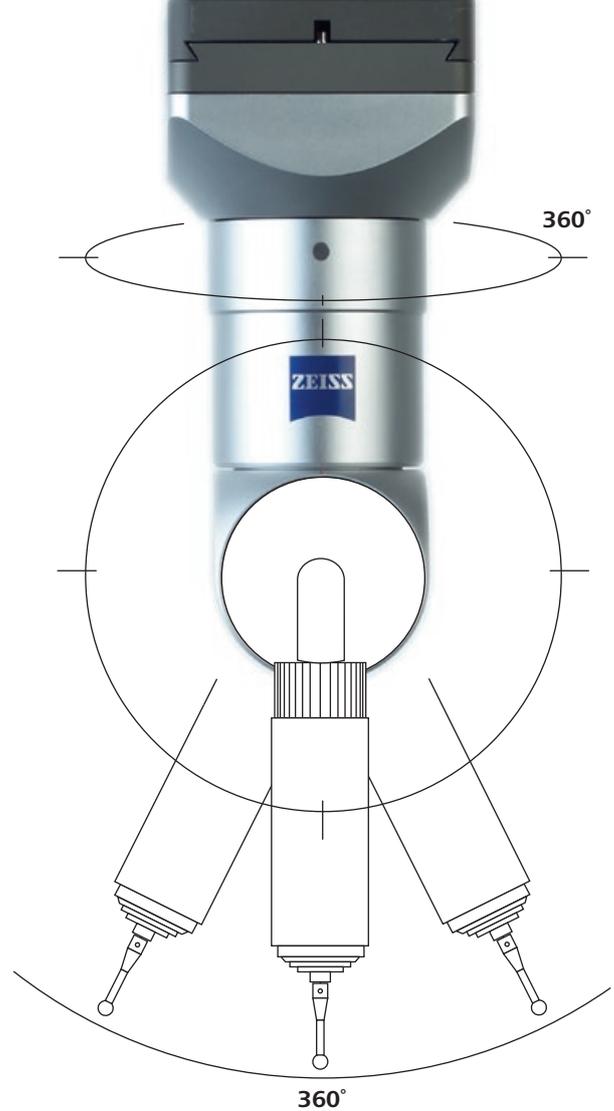
## ZEISS RDS

### The basis for maximum flexibility

The best articulating probe holder in its class enables you to reach virtually all angles via numerous single positions.

The ZEISS RDS articulating probe holder is particularly well-suited for measuring complex parts, where features require many styli with different spatial directions. It reaches up to 20,736 positions in 2.5-degree increments – thus providing access to every part feature. This is made possible by the horizontally and perpendicularly arranged rotary axes with rotational ranges of plus/minus 180 degrees.

Furthermore, the ZEISS RDS-CAA for touch-trigger and measuring sensors leads to shorter calibration times: only a few spatial angular positions require calibration. During programming, the ZEISS RDS can be easily positioned using the joystick on the control panel to enable shorter programming times. Designs for machines in standard, compact and multisensor configurations.



#### Compatible sensors:

- ZEISS ViScan
- ZEISS LineScan
- ZEISS VAST XXT
- ZEISS XDT
- ZEISS RST-P



*The accuracy and range of motion offered by ZEISS RDS is unparalleled. ZEISS RDS is also highly flexible: this sensor carrier also accommodates contact and optical sensors*

## ZEISS CSC

### Maximum dynamics and precision

More powerful, faster and more accurate – the ZEISS CSC sensor establishes a new standard for continuous articulating units and is thus ideal for the volume measurement demands of complex car body parts.

Optical and contact sensors must be optimally positioned for the volume measurement of complex car body parts if they are also to measure difficult-to-reach points in the part interior. Long extensions are often required. It is exactly here that the ZEISS CSC opens up opportunities that have been unavailable until now: this is due to the significant torque reserves combined with maximum resolution and precision.

In order to optimally control processes in car body construction, the results of the measurement must be available as quickly as possible. The high dynamic of the ZEISS CSC considerably reduces the measuring time – without sacrificing safety. An in-house safety concept enables the integration of a collision-protected bearing for the sensor plate in addition to the known collision protection for the articulating unit. This prevents sensor damage in the event of a collision with the part during setup operations.

Another benefit of the ZEISS CSC is the completely reengineered stylus changer. As with the ZEISS RDS stepping, articulating unit, the changer is now completely passive. Therefore, compressed air is no longer required on the measuring machine, which also means cost savings for the user. The changer can be positioned as needed because it also operates without electrical connections.





*The new Continuous Sensor Carrier (CSC) from ZEISS Industrial Metrology allows full rotations of 360 degrees in one direction and supports stylus extensions up to 800 millimeters to provide added flexibility in hard-to-reach locations. The ZEISS CSC is intended for horizontal-arm measuring machines used for challenging jobs in prototype construction or in process optimization, particularly in the automotive industry*

## ZEISS RST-P

### Precision in all probing directions

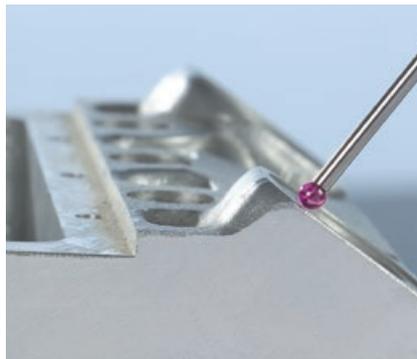
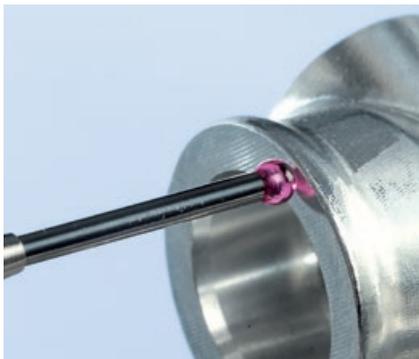
Thanks to a unique combination of technical features, the ZEISS RST-P touch-trigger sensor enables a wide range of applications and delivers high precision in all probing directions.

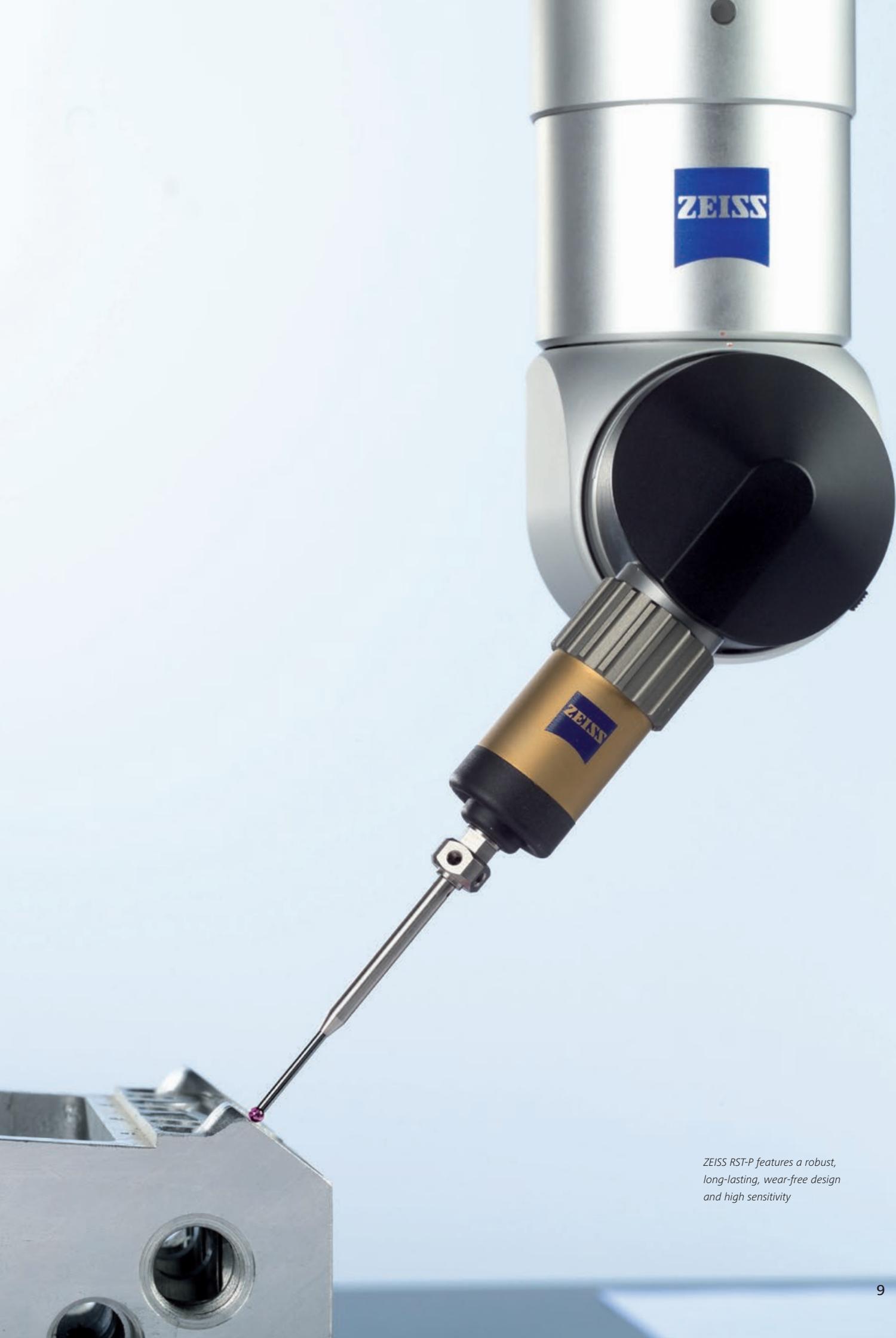
This sensor is known for its fast and dynamic capture of measurement data through single-point probing, free from stylus bending and mechanical hysteresis.

ZEISS RST-P works according to a dual principle. This means it delivers the actual probing pulse from the piezoelectric elements located in front of the kink point. The three-point bearing also serves as a mechanical kink point that verifies probing and protects the RST-P from damage caused by contact with the workpiece and collisions.

Moreover, the deflection forces caused by the bearings and direction do not influence the measuring result: ZEISS RST-P delivers the same accuracy in all probing directions. Special calibration is not required for slanted measuring or probing jobs.

In the automotive, engineering, tool-making and mold-making industries, this sensor is the best solution for linear measurements on prismatic parts or fast point sequences on any surface.





*ZEISS RST-P features a robust, long-lasting, wear-free design and high sensitivity*

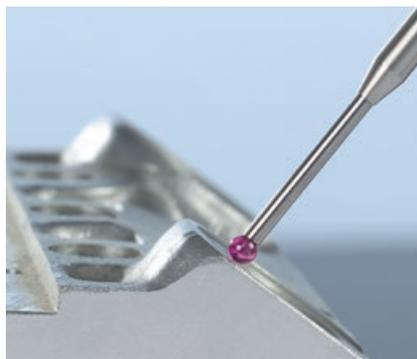
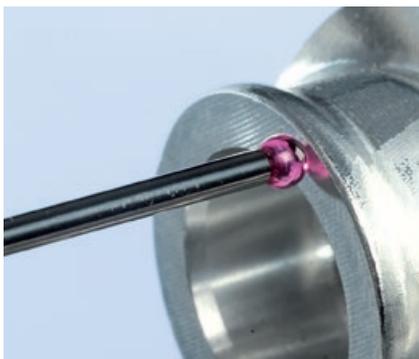
## ZEISS XDT

### Precision in all probing directions

Thanks to a unique combination of technical features, the ZEISS XDT multipoint sensor enables a wide range of applications and delivers high precision in all probing directions.

There are many instances when users require the flexibility of an articulating probe holder. Compared to touch-trigger sensors, the ZEISS XDT enables an increase in the operating safety and accuracy of the measurements.

Unlike touch-trigger, single-point measuring, single-point scanning with sliding acquisition of measuring points provides a result featuring maximum accuracy and reliability. With single-point scanning, the measuring point is measured with at least 100 measuring points. Outliers are no longer important, and considerably improved accuracy is guaranteed.



*ZEISS XTD features a robust, long-lasting,  
wear-free design and high sensitivity*



## ZEISS ViScan

### Spotlight on two dimensions

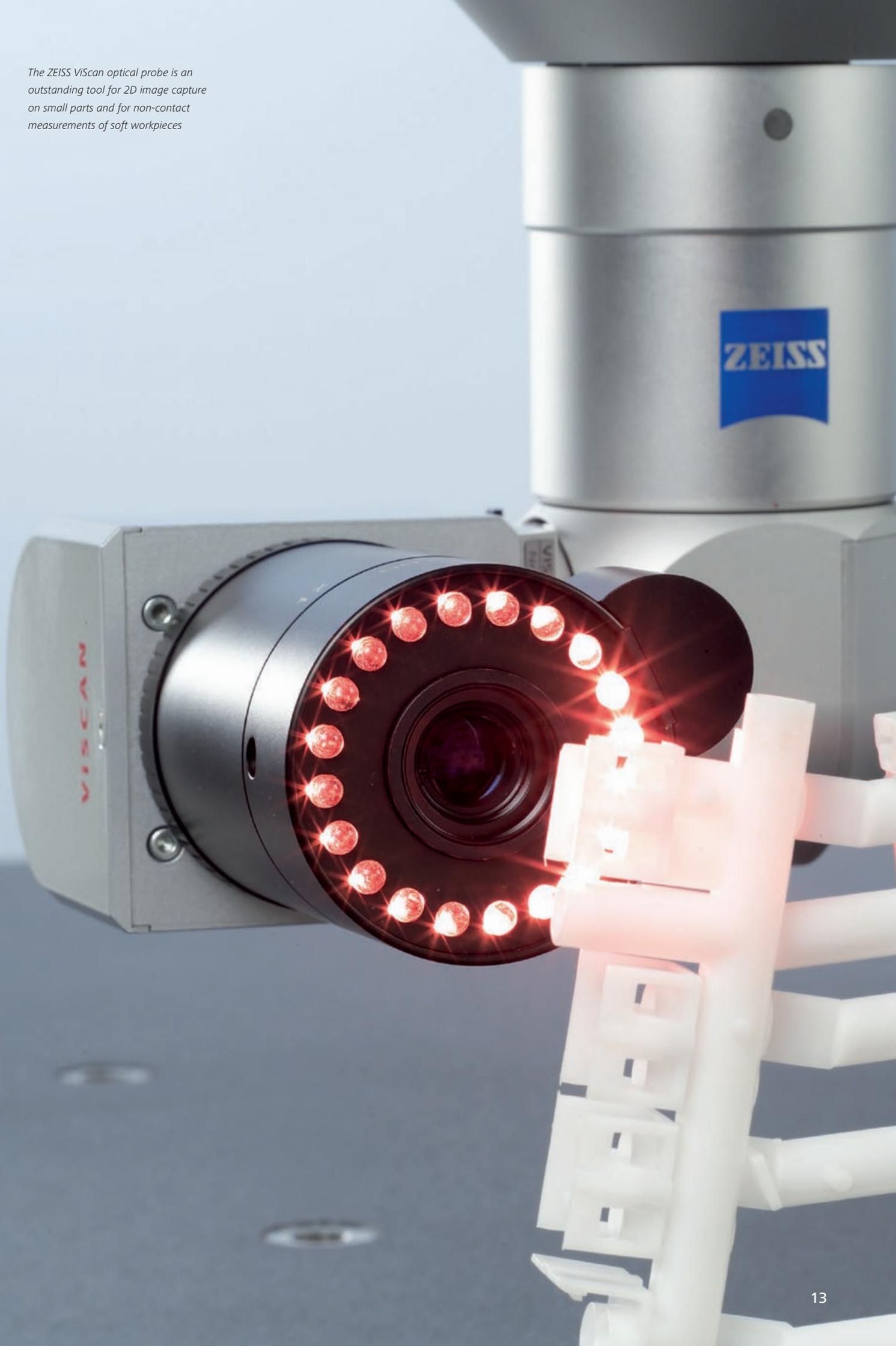
The complexity of test pieces today is so extensive that contact or optical sensors alone are no longer sufficient. With the ZEISS ViSCAN 2D optical probe, it is now possible to perform contact and optical measurements on one machine.

The hallmark of ZEISS ViScan is its flexibility in all aspects: combined with ZEISS RDS, it permits measurements in all spatial directions without rechucking the part. Different lenses are also available. The working distance is practically independent of the lens used, thus allowing the measurement of deep features. In addition to the measurement in the image, the auto-focus system also permits measurements perpendicular to the camera plane.

ZEISS ViScan is particularly well-suited for the measurement of parts with very small or two-dimensional geometries and/or soft materials such as sheet metal, rubber or plastic parts. Difficult measurements can also be performed on low-contrast test pieces such as punched components or printed circuit boards using the optional, mobile transmitted light stages with LED illumination.



*The ZEISS ViScan optical probe is an outstanding tool for 2D image capture on small parts and for non-contact measurements of soft workpieces*



## ZEISS LineScan

### Point clouds at the speed of light

ZEISS LineScan is the tool of choice when capturing the entire surface of forms using point clouds is important – whether for a comparison with available nominal CAD data sets or for the creation of a new CAD model.

ZEISS LineScan is extremely fast: up to 700,000 points per second can be captured for high-speed digitizing. The short measuring times lead to a considerable increase in productivity. ZEISS CALYPSO measuring software and the automatic sensor change out on machines featuring mass technology also contribute to the high productivity of this sensor. The accuracy also increases thanks to the definable point grids and consolidation possibilities for intelligent point reduction.

The ZEISS LineScan optical sensor is the tool of choice, particularly for car bodies, mold/tool making, construction and design, as well as for contact-sensitive or finely structured surfaces.





ZEISS

LineScan

ZEISS

*When a fast measurement of freeform workpieces for a smooth form measurement is required the ZEISS LineScan optical sensor is the ideal choice*

## ZEISS DotScan

### More light on the subject

Chromatic white light sensors enable the non-contact capture of workpiece topography. These are generally used when sensitive, reflective or low-contrast surfaces make it difficult to use other optical sensors.

ZEISS DotScan is an outstanding option for capturing freeform surfaces and even for minute structures. Chromatic white light sensors – and hence also the ZEISS DotScan – are the method of choice, especially when styli or camera sensors reach their limits on sensitive, soft, reflective or low-contrast surfaces. By using ZEISS DotScan, strongly reflective surfaces, such as metal components in knee implants, can be scanned without any need to inject them with a contrast medium. This also makes it possible to distinguish transparent lacquered surfaces from other underlying metallic layers.

ZEISS DotScan is available in three sizes for three different measuring ranges: 10, 3 and 1 mm. The sensor can be exchanged fully automatically for other contact or optical sensors within a single CNC run. With increments of 2.5 degrees, the articulated axis can align the ZEISS DotScan so that it is perpendicular to the surface of the component being scanned. And since the maximum measuring angle of the ZEISS DotScan 1 mm is plus/minus 30 degrees, even more strongly curved components can be scanned.

Thanks to the sensor's mode of operation, a wide variety of materials can be scanned from all sides without difficulty. In conjunction with a rotary table, even measuring jobs with 4-axis scanning can be performed.





*Transparent surfaces or highly reflective surfaces such as here on a rear light are no problem for the ZEISS DotScan. With the aid of the articulated axis of the RDS, the ZEISS DotScan can reach all areas without difficulty.*

## ZEISS VAST XXT

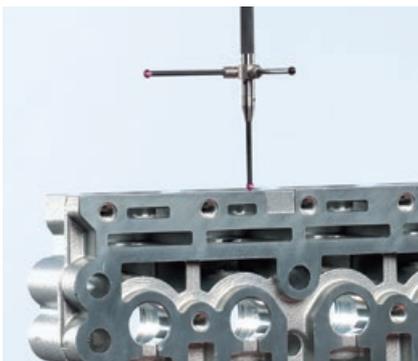
### Scanning done differently

ZEISS VAST XXT allows high-accuracy scanning on the ZEISS RDS articulating probe holder.

There are a large number of measuring applications that can benefit from the flexibility of an articulating probe holder combined with scanning capability. ZEISS VAST XXT is ideal for such tasks.

Compared to touch-trigger sensors, ZEISS VAST XXT increases the operational safety and accuracy of the measurements. It also adds scanning functionality, thus providing information on the form of the features.

The compact design of lightweight scanning sensors on the articulating probe holder requires different sensor modules. With only three modules, ZEISS VAST XXT covers the typical stylus length ranges for this sensor design. This sensor accommodates lateral styli up to 65 millimeters. It is also suitable for fixed installation.





*Combined with ZEISS RDS, ZEISS VAST XXXT is particularly well-suited for measurements of complex parts requiring many angular positions. Lightweight and compact stylus configurations such as the star probe are used here*

## ZEISS VAST XTR gold

### Scoring points with speed

Thanks to the integrated rotary axis, the new ZEISS VAST XTR gold probe always positions the stylus in the direction of the feature being measured, maneuvers effortlessly through gaps and thus gets to wherever it is needed.

ZEISS VAST XTR gold is based on the ZEISS VAST XT gold design. The navigator and performance functions are fully supported by ZEISS VAST XTR. ZEISS VAST navigator is an expert system that recommends the optimal measuring speed for the desired accuracy. The VAST performance function enables the stylus to scan interrupted contours without sacrificing speed or precision.

The key differentiating feature is the integrated swivel joint. It enables the stylus mount to turn as far as possible in 15 degree increments and thus always be positioned at the right angle to the part.

ZEISS VAST XTR with the integrated swivel joint is as reliable and accurate as traditional "fixed" styli. Users can rely on the proven precision. There are a wide range of workpieces in which the strengths of the probe are particularly evident. These include parts with many features and angular positions such as those on gear housings for helicopters and locomotives. ZEISS VAST XTR gold is also suitable for

rotationally symmetric workpieces such as ventilation gears or turbines. Thanks to the swivel joint, the probe reaches interior gears that until now could only be measured using complex stylus configurations.

The new sensor also has a particularly positive effect on large and heavy parts, e.g. in shipbuilding, in wind power or in the heavy equipment industry. With workpieces weighing more than five tons, it is difficult to find a rotary table suitable for the required accuracy and workpiece weight.





## ZEISS VAST XT gold

### All systems go for active scanning

The line of active ZEISS VAST sensors plays a major role in all metrology applications that demand maximum precision with large stylus configurations. ZEISS VAST XT gold provides the foundation for entry into the world of active scanning technology.

ZEISS VAST XT gold features an additional measuring system. The measuring force can be configured depending on the measuring job. It is also used for a line of correction procedures.

In addition to active scanning, this sensor also allows single-point measurements: for example, the sensor enables the flexible use of complex stylus configurations and self-centering.

Thanks to its high-speed scanning capabilities, ZEISS VAST XT gold can perform practically any job: form and location measurements, curve and freeform measurements, and reverse engineering. The applications cover plastic machined parts and Styrofoam, brake components, crankshafts, engine blocks and turbine blades.





*ZEISS VAST XT gold accommodates complex and thus heavy stylus configurations: stylus lengths up to 500 mm and stylus weights up to 500 g can be combined with ZEISS VAST XT gold*

## ZEISS VAST gold

### Peak scanning performance guaranteed

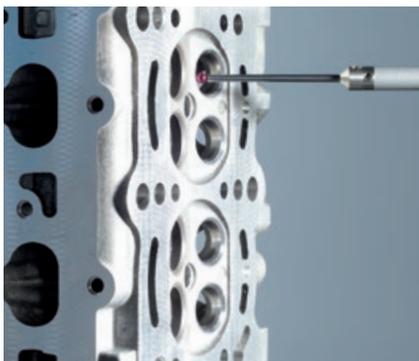
The active scanning sensor offers higher dynamics through optimized moving masses and higher rigidity resulting from optimized joints.

ZEISS VAST gold is the ideal sensor for contact scanning and single-point measurements with long styli up to 800 mm and stylus weights up to 800 g. Asymmetrical stylus configurations can also be used with ZEISS VAST gold.

ZEISS VAST gold is also known for its high scanning speeds with navigator technology. Thanks to the integrated collision protection, ZEISS VAST gold is extremely robust. Dynamic damping enables continuous operation. The probing force can be adjusted to the stylus geometry and the workpiece material, and is always constant – it can be programmed between 50 and 1,000 millinewtons.

In combination with navigator technology in particular – object-optimized ZEISS CALYPSO software from ZEISS featuring automatically generated measurement strategies – ZEISS VAST gold increases the measuring performance and thus productivity considerably.

The FlyScan and QuickChange from ZEISS technologies in the Performance Package ensure maximum productivity. The short travel path on ZEISS FlyScan results in time savings of up to 40 percent. The QuickChange function accelerates the automatic change out of measuring styli by up to 60 percent.





*Size, form and location in one setting  
on one machine in one reference  
system – that is ZEISS VAST gold*

## ZEISS EagleEye navigator

### Keen eyes in car body measurement

Quality assurance in car body construction is one of the most complex jobs in metrology. EagleEye navigator is based on a completely new optical measuring technology that precisely meets these demands.

Automobile manufacturing requires measurements of countless bores in addition to edges, sections or transitions. Checking boreholes is extremely time-consuming work, particularly for serial inspection. ZEISS EagleEye navigator leads to time savings of almost 50% for the entire car body. Typical, labor-intensive steps in traditional measuring methods are completely eliminated: no assembly and disassembly of threaded adapters, no material and storage or handling costs.

But that is not all. The use of ZEISS EagleEye navigator immediately reduces throughput times and simultaneously increases the quality of pressed parts. This results in top-quality evaluations of the results with information on the diameter, location and form of the part feature with micrometer accuracy.

ZEISS EagleEye navigator turns your measuring machine into production equipment.



*ZEISS EagleEye navigator is based on a very simple mathematical principle: triangulation. This states that all elements of a triangle can be calculated if two angles and one side of the triangle are known*



## ZEISS FalconEye

For fast, accurate analysis

These days, the automotive industry has less and less time to develop new vehicle models. This means proven solutions have to be combined with the latest technology. With ZEISS FalconEye, it is now possible to also use the same technology as that of the ZEISS EagleEye navigator on stepping, articulating probe holders.

In car manufacturing, countless elements such as boreholes, sections or threaded bolts have to be measured, including the finished vehicles themselves. For new vehicles, parts must be analyzed quickly and accurately. The requirements are very challenging and inspections are extremely time-consuming – particularly for serial inspection. The ZEISS FalconEye optical sensor system, which is modeled on the technology of the ZEISS EagleEye navigator, overcomes these challenges, as it can be additionally used on stepping, articulating probe holders.

To obtain the required measuring results quickly and easily, the sensor has to be optimally integrated into the overall system. The ZEISS RDS-CAA stepping, articulating probe holder is ideal because only a few single positions have to be calibrated, but all angular settings are available for the application. This enables a considerable reduction in measuring times. Through the utilization of an additional manual rotary axis, the ZEISS FalconEye system can be positioned in

three angular settings with very accurate repeatability, permitting the laser line to be aligned relative to the part. Therefore, the sensor provides users with an outstanding system to quickly and accurately complete their jobs. The new ZEISS FalconEye system has also been optimally integrated into the ZEISS CALIGO software package.





*ZEISS FalconEye is primarily used for jobs where results have to be obtained as quickly as possible. The additional rotary axis allows optimal alignment relative to the part*

## ZEISS ROTOS

### A roughness sensor that unites all characteristics

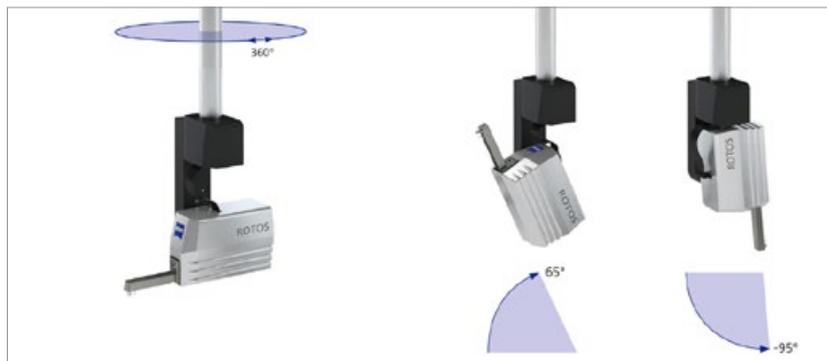
For the quality inspection of components, e.g. in the powertrain of vehicles, it must be possible to inspect roughness and waviness in compliance with standards.

The ZEISS ROTOS roughness sensor enables just this on a single coordinate measuring machine for the first time. Operators benefit from a simplified workflow for added measuring certainty and enormous time savings.

ZEISS ROTOS is intended for users that inspect size, location or form on a coordinate measuring machine (CMM) and also need to measure roughness and waviness on the same workpiece. Thanks to the ZEISS ROTOS roughness sensor, all characteristics of a technical drawing can be fully measured with one CMM and displayed in one record. It is no longer necessary to transfer to a surface measuring instrument.

Various measuring positions can be reached without rechucking and a fully automatic run is possible without the operator influencing the surface measurement. This takes just a few seconds compared to the previous several minutes. Because it is no longer necessary to transport and clamp the part, the susceptibility to errors throughout the process and operator influence are virtually eliminated.

But there is more: ZEISS ROTOS can be positioned flexibly to reach all surfaces on a part without rechucking. Furthermore, the sensor features a rotating/tilting axis. The rotary axis can turn a full 360 degrees. Measurement data from ZEISS ROTOS is transmitted via Bluetooth to the analysis computer. The data is then imported into ZEISS CALYPSO software via a machine driver and can be exported with other measurement data in a common record.



Very flexible: the ZEISS ROTOS features horizontal tilt of 360° and vertical tilt of 160°

*ZEISS ROTOS is ideal for powertrain components*



## Measuring accessories

### The right equipment for your requirements

ZEISS stands for maximum quality. This applies just as much to our styli and accessories as it does to our measuring machines. We have many years of experience in the development, manufacture and use of our components for a wide range of tasks.

We implement know-how in an innovative combination of materials and production techniques to provide you with outstanding benefits.

#### Stylus system equipment

Our entire range of styli is designed for volume measurements and for continuous operation in production and the measuring room.

The quality, type and dimensions of the styli depend on how you measure your workpiece. This allows you to fully benefit from the potential of your machine.

#### ZEISS ThermoFit® Pro

The ZEISS ThermoFit® Pro kit enables you to quickly build high-quality stylus systems for use in production. The locked connections and our ZEISS ThermoFit® technology provide maximum rigidity and temperature stability. You can easily configure angles and special cubes on site.

#### Fixtures

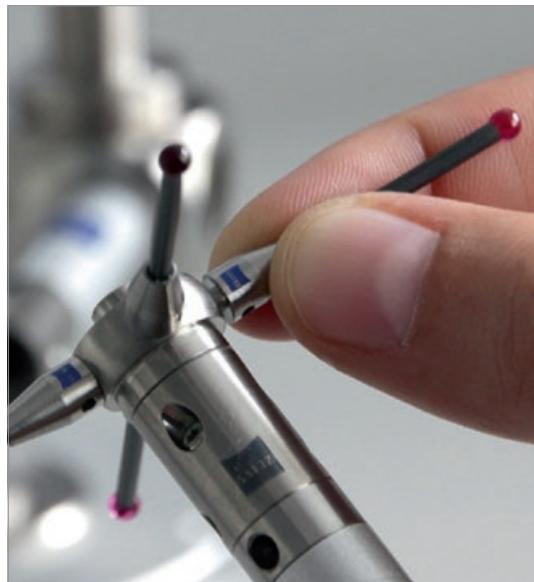
Our fixtures featuring proven loading systems help you ensure the reliability of your volume measuring results. Manual or fully automatic – you determine the level of automation required.

#### Stylus racks

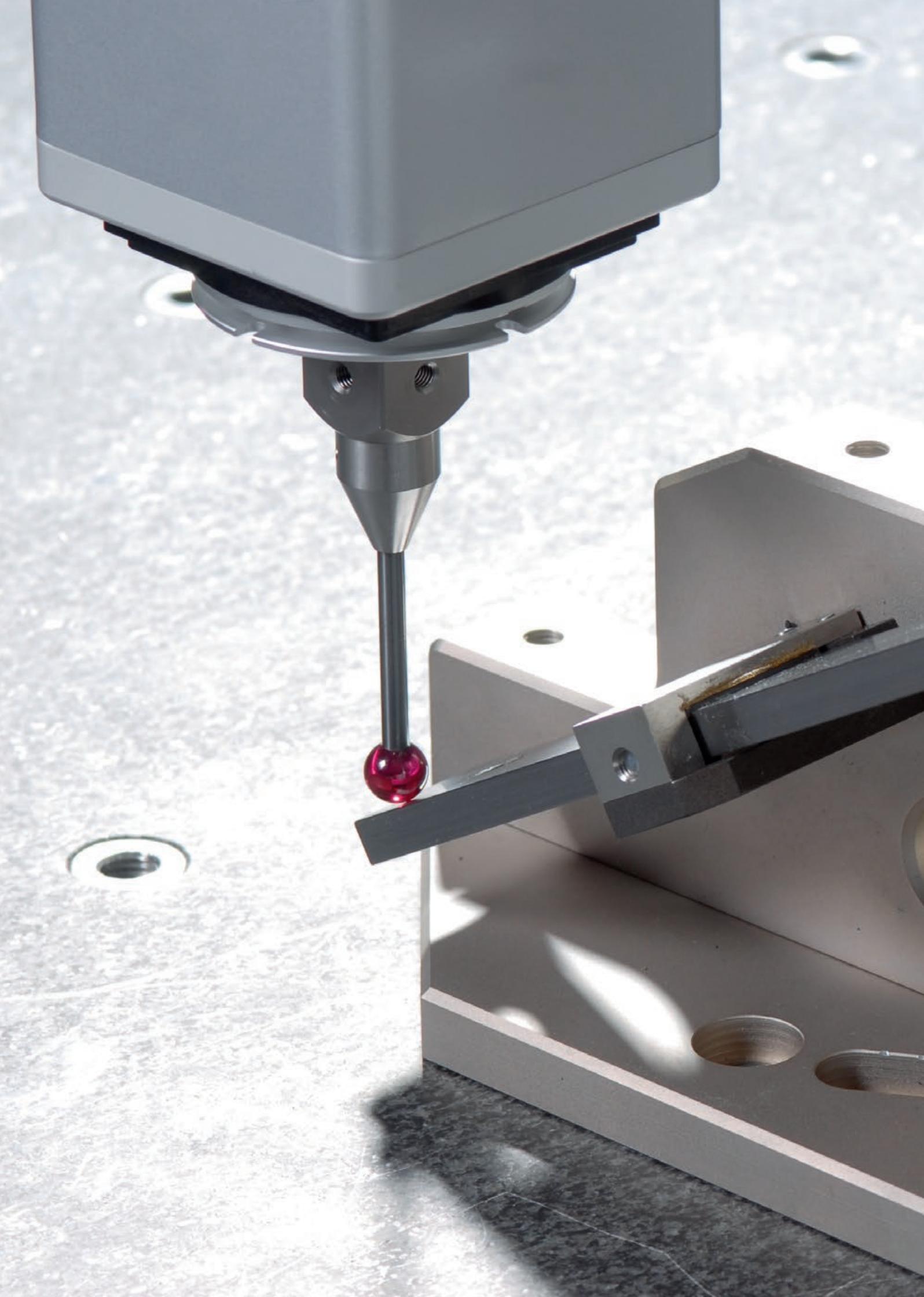
We offer three different automatic stylus racks: the moveable ZEISS ProMax and ZEISS ProMax light, and the configurable ZEISS ProMax basic stylus rack. This enables you to move the styli required for measurement in and out of the measuring range.

#### Artifacts

Artifacts are used to regularly monitor the accuracy of measuring machines. We offer calibrated, traceable artifacts and software for the standard-compliant monitoring of coordinate measuring machines, stylus systems and rotary tables to ensure that you can reliably monitor your measuring results.



Visit our stylus and accessories web shop:  
[www.probes.zeiss.com](http://www.probes.zeiss.com)



# ZEISS MSR, ZEISS MSR mini, ZEISS ProMax, ZEISS ProMax light

## Extras in the premium segment

When different parts are measured, a variety of stylus configurations are required. These are managed and changed out using CNC measuring programs. This challenge can be easily mastered with a stylus rack from ZEISS.

### ZEISS MSR, ZEISS MSR mini

The MSR multi-sensor rack is an intelligent and economical solution for all bridge-type measuring machines. The freely selectable sensor and stylus racks ensure a high level of flexibility, thus keeping all future system enhancements on the table for operators of ZEISS coordinate measuring machines.

#### Benefits:

- Flexible loading of the MSR with all stylus and sensor racks from ZEISS.
- Vertically adjustable assembly level for customized use
- Robust and sturdy design
- Standard: two rack levels, expandable to three levels.

### ZEISS ProMax, ZEISS ProMax light

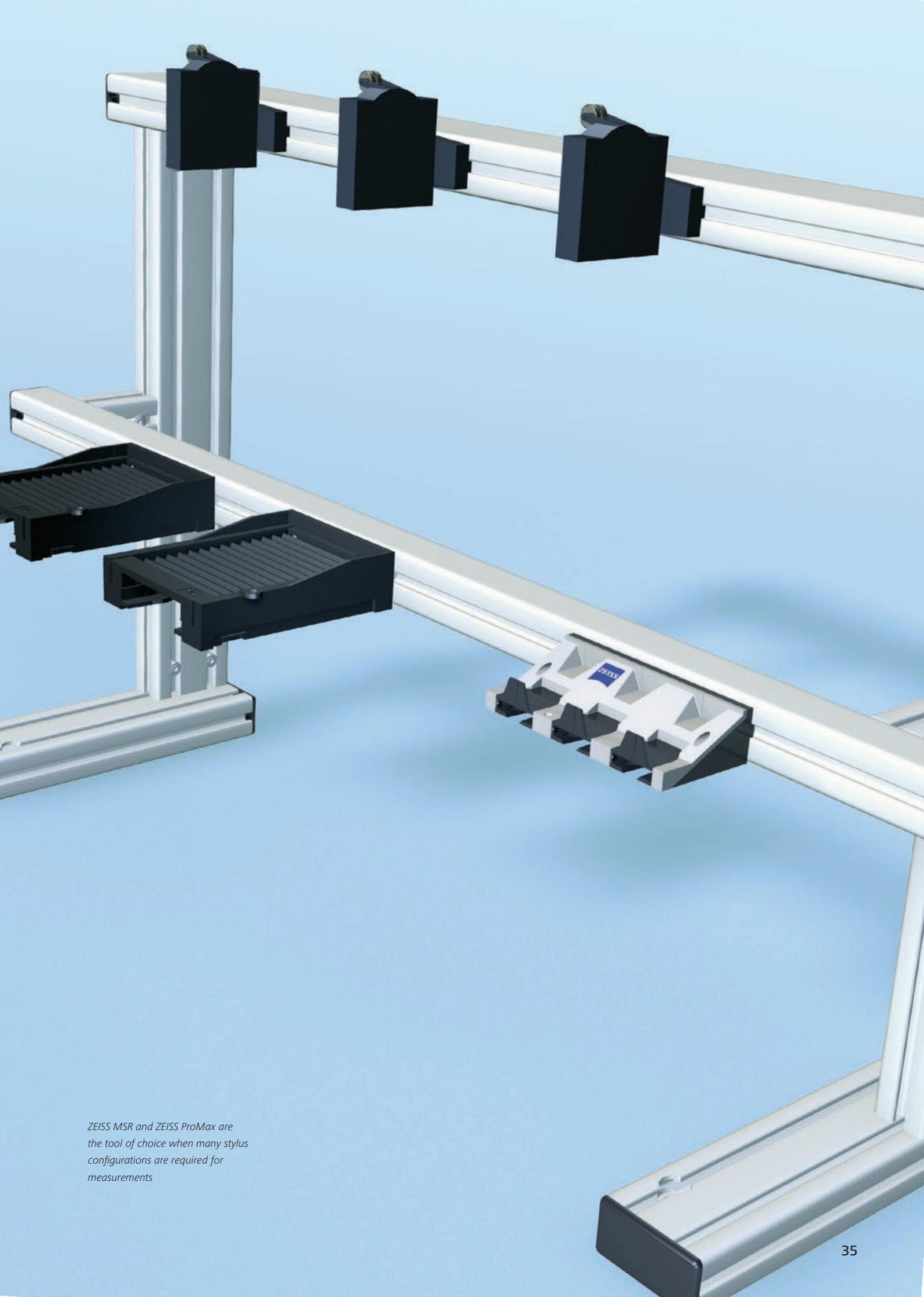
Ten to fifteen styli are often stored on two levels in the measuring range for the measurement of complex workpieces. A typical stylus rack thus requires up to 25 percent of the measuring range of the CMM. The travel range becomes limited as a result of the rigid stylus rack, particularly during the measurement of large workpieces for which very long styli (in the Y direction) are used. The solution: ZEISS ProMax automatically moves the multi-sensor rack out of the measuring range when a stylus is not needed.

#### Benefits:

- The styli are no longer in the collision range
- ZEISS ProMax light can be directly used with existing measuring programs without changes
- ZEISS ProMax light features a robust design and can be configured as easily as the standard rack
- Compatible with ZEISS CALYPSO and ZEISS CMM-OS



MSR, MSR mini, ProMax and ProMax light from ZEISS are ideal for the entire range of ZEISS sensors.



*ZEISS MSR and ZEISS ProMax are  
the tool of choice when many stylus  
configurations are required for  
measurements*

# Specifications

## ZEISS RDS



ZEISS ViScan

ZEISS LineScan

ZEISS DotScan

ZEISS RST-P



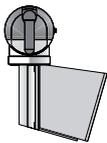
<b>Design</b>	Camera sensor (with software autofocus)	Optical triangulation line sensor	Confocal white light sensor	Touch-trigger single-point sensor
<b>Probing procedure</b>	Optical 2D scanning	Optical line scanning Measuring rate: Max. 700,000 points/s Max. 1,000 lines/s	Single-point, optical scanning, max. 1000 points/s	Single-point
<b>Probing force <sup>(1)</sup></b>	-	-	-	-
<b>Probe measuring range</b>	Camera resolution: 768 (horizontal) x 576 pixels (vertical)	25/ 50/ 100 mm	10/ 3/ 1 mm	-
<b>Probe deflection range<sup>(3)</sup></b>	-	-	-	-
<b>Stylus changer</b> Manual change out via software (electromagnetic receptacle)	CNC change out in conjunction with stylus rack and controller software	CNC change out in conjunction with stylus rack and controller software	CNC change out in conjunction with stylus rack and controller software	CNC change out in conjunction with stylus rack and controller software
<b>Sensor extensions <sup>(4)</sup></b>	-	-	max. 300 mm	max. 300 mm
<b>Stylus weight</b>	-	-	max. 10 g	max. 10 g
<b>Stylus length axial lateral <sup>(2)</sup></b>	-	-	max. 90 mm	max. 90 mm
<b>Min. sphere diameter</b>	-	-	0.5 mm	0.5 mm
<b>Working distance</b>	75 – 90 mm depending on lens	63/ 94/ 220 mm	50/ 21 / 10 mm	-
<b>Resolution</b>	6.25 x 6.5 µm pixel size	Max. 1280 points/line	60 / 36 / 28 nm	-
<b>Laser class</b>	Illumination equipment is also laser protection class	2M (no special protection measures)	-	-
<b>Line width</b>	-	max. 25/ 50/ 80 mm	Spot size: 16 µm / 9 µm / 8 µm	-

<sup>(1)</sup> Nominal force while measuring, the force at the moment of contact is higher

<sup>(2)</sup> Please note geometry specifications

<sup>(3)</sup> Depending on stylus length

<sup>(4)</sup> Depending on target system, can influence measuring accuracy

ZEISS XDT	ZEISS VAST XXX TL1	ZEISS VAST XXX TL2	ZEISS VAST XXX TL3	ZEISS FalconEye navigator
				
Multi-point sensor	Passive scanning sensor	Passive scanning sensor	Passive scanning sensor	Optical triangulation line sensor
Multi-point sensor	Single-point, scanning	Single-point, scanning	Single-point, scanning	Optical line scanning
-	Depends on stylus length: 0.01 – 0.13 N	Depends on stylus length: 0.01 – 0.13 N	Depends on stylus length: 0.01 – 0.13 N	-
-	max. ±1.7 mm	max. ±1.7 mm	max. ±1.7 mm	+52 mm – 30 mm
max. ±3 mm	max. ±3 mm	max. ±3 mm	max. ±3 mm	-
CNC change out in conjunction with stylus rack and controller software	CNC change out in conjunction with stylus rack and controller software	CNC change out in conjunction with stylus rack and controller software	CNC change out in conjunction with stylus rack and controller software	CNC change out in conjunction with stylus rack and controller software
max. 100 mm	max. 100 mm	max. 100 mm	max. 100 mm	-
max. 15 g	max. 10 g	max. 10 g	max. 15 g	-
max. 30 – 150 mm max. 65 mm	30 – 125 mm max. 40 mm	125 – 250 mm max. 40 mm	30 – 150 mm max. 65 mm	-
0.3 mm	0.3 mm	0.6 mm	0.3 mm	-
-	-	-	-	102 mm
-	-	-	-	5 µm
-	-	-	-	2M (no special protection measures)
-	-	-	-	max. 66 mm min. 35 mm

# Specifications

	ZEISS EagleEye	ZEISS VAST XTR gold	ZEISS VAST XT gold	ZEISS VAST gold
				
<b>Design</b>	Optical triangulation line sensor	Active scanning sensor	Active scanning sensor	Active scanning sensor
<b>Probing procedure</b>	Optical line scanning	Single-point, self-centering scanning, navigator capable	Single-point, self-centering scanning, navigator capable	Single-point, self-centering scanning, navigator capable
<b>Probing force*</b>	-	Continuous from 0.05 to 1 N	Continuous from 0.05 to 1 N	Continuous from 0.05 to 1 N
<b>Probe measuring range</b>	60 mm – 40 mm	±1 mm	±1 mm	±2 mm
<b>Probe deflection range</b>	-	x/y ±1.6 mm z ±1.6 mm	x/y ±2.0 mm z ±2.5 mm	x/y ±2.5 mm z ±3.0 mm
<b>Stylus changer</b> Manual change out via software (electromagnetic receptacle)	CNC change out in conjunction with stylus rack and controller software	CNC change out in conjunction with stylus rack and controller software	CNC change out in conjunction with stylus rack and controller software	CNC change in conjunction with stylus rack and controller software; RST-Z via active interface changeable
<b>Sensor extensions</b>	-	-	-	-
<b>Stylus weight</b>	-	max. 500 g	max. 500 g	max. 800 g
<b>Stylus length</b>	-	max. 350 mm	max. 500 mm	max. 800 mm
<b>Min. sphere diameter</b>	-	0.3 mm	0.3 mm	0.3 mm
<b>Working distance</b>	90 mm	-	-	-
<b>Resolution</b>	-	<50 nm	<50 nm	<50 nm
<b>Laser class</b>	2M (no special protection measures)	-	-	-
<b>Line width</b>	max. 103 mm min. 48 mm	-	-	-

## ZEISS ROTOS



Design	Skidless contact surface texture sensor with LVDT detector and 2 continuous rotating / tilting axes
<b>x axis (measurement feed)</b>	
Maximum travel range (x axis)	17.5 mm
Max. resolution in x axis (digital)	0.1 nm
Speed	0.25 - 1.0 mm/s
<b>z axis (profile amplitude)</b>	
Measuring range (z axis)	1000 µm
Max. resolution in z axis (digital)	0.05 nm
<b>Accuracy</b>	
Detectable roughness on CMM system (Ra)	>0.5 µm
<b>Diamond tip</b>	
Cone radius	2 µm 90° (60° available) (5µm 90°available)
<b>Electrical data</b>	
Bluetooth	Bluetooth V 3.0 (Class-1) connection between sensor and sensor driver software Bluetooth connection to controller
Battery	NiMH battery with battery charger for probe socket (requires free probe socket and sufficient room for sensor and charger on the stylus rack)
<b>Requirements</b>	
Minimal changer rack height	335 mm to installation plane (position of sensor plate)
<b>Measuring task dimensions</b>	
Smallest hole diameter	>13 mm (30 mm hole depth)
Smallest hole diameter (whole sensor)	>75 mm (350 mm hole depth, only vertical)
Minimal required measurement length	11 mm
<b>Roughness parameters</b>	
	Pa, Pq, Pt, Pz, Pp, Pv, Psk, Pku, Pdelta_q, c, PSm, PPc, PHSC, PtISO12085, Pmr, Pmr (c), Pdelta_c, Wa, Wq, Wt, Wz, Wp, Wv, Wsk, Wku, WΔq, Wc, WSm, WPC, WHSC, W, AW, Wx, Wte, Wdelta_c, Wmr, Wmr (c), a, Rq, Rt, Rz, Rp, Rv, Rsk, Rku, Rdelta_q, Rc, RSm, RPC, RHSC, Ry5, Rmax, RzJIS, Rpm, Rvm, Rp, Ra75, RDelta_a, RpASME, RvASME, PcASME, RzDIN, R, AR, Rx, Rke, Rpke, Rvke, Mr1e, Mr2e, A1e, A2e, Rdelta_c, Rmr, Rmr(c), Htp, tp, Mr1, Mr2, A1, A2, Rk, Rpk, Rvk, WDC, WDt, WDSm

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