

Contact and optical sensors

from a 360° perspective



We make it visible.

A close-up photograph of a precision metal tool, likely a probe or stylus, with a red spherical tip resting on a metallic surface. The tool is positioned vertically, and the red sphere is in sharp focus, reflecting light. The background is blurred, showing a bright light source and the metallic surface of the tool's shaft.

Bright future with sensors from Carl Zeiss

The product line of Carl Zeiss Industrial Metrology – the technology leader – is extremely versatile and includes coordinate measuring machines, sensors, software, technical service, comprehensive customer service and support. Carl 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 Carl Zeiss offers the solution.



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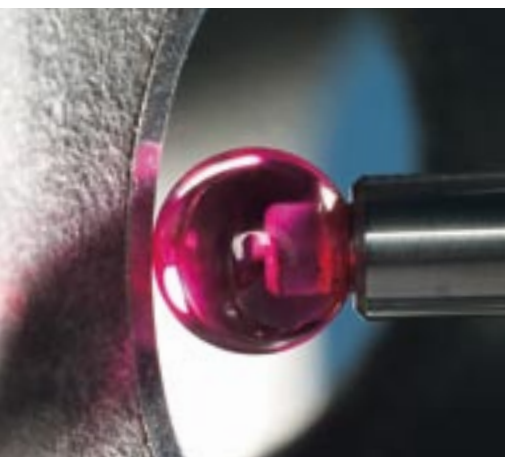
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Contact



Flexible



Optical



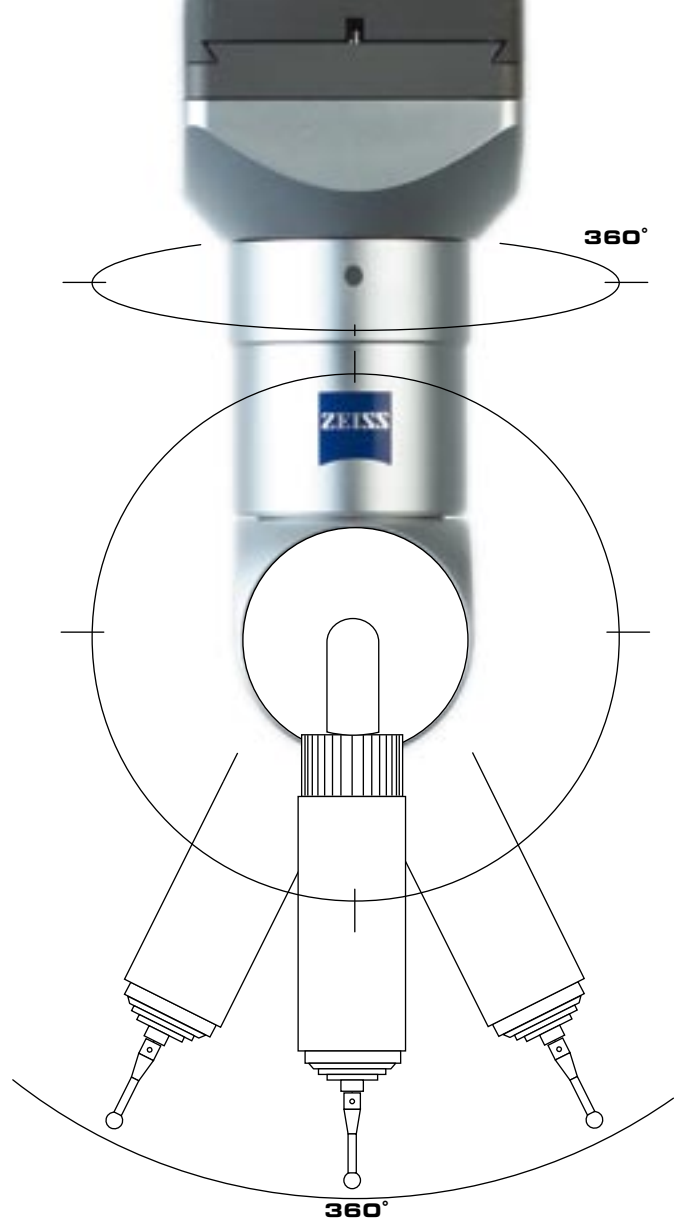
RDS.

The basis for maximum flexibility.

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

The 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 – therefore providing access to every part feature. This is made possible by the horizontally and perpendicularly allocated rotary axes with rotational ranges of plus/minus 180 degrees.

Furthermore, the RDS-CAA for touch-trigger sensors leads to shorter calibrating times: only a few spatial angle positions require calibration. Programming times are also reduced as the RDS can be easily positioned using the joystick on the control panel.



Compatible sensors:

- RST-P**
- ViSCAN**
- DTS**
- LineScan**
- VAST XXT**



RDS

The accuracy and range of motion offered by RDS is unparalleled by any other articulating system. RDS is also highly flexible: contact and optical sensors are also used with this sensor carrier.

RST-P.

Precision in all probing directions.

As a result of a unique combination of technical features, the RST-P touch-trigger sensor enables a broad range of applications and delivers high precision in all probing directions.

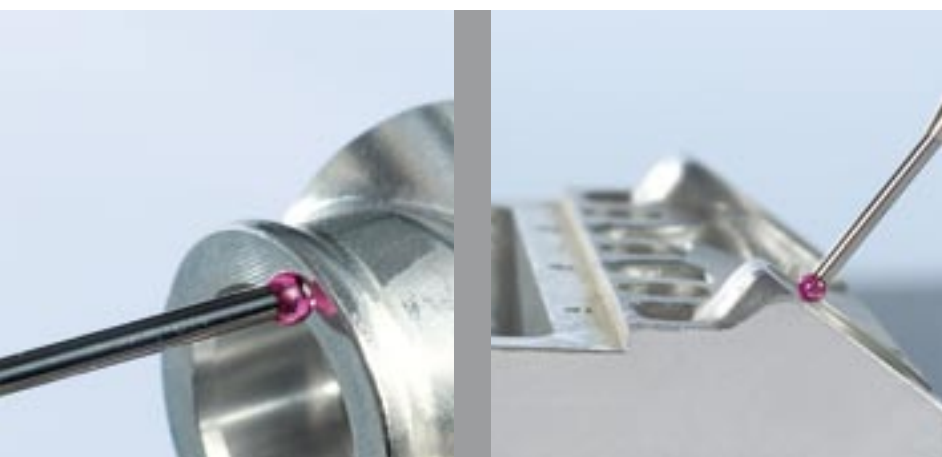
The characteristic feature of this sensor is the fast and dynamic capture of measurement data through single-point probing, free from stylus bending and mechanical hysteresis.

RST-P works according to a dual principle. This means it delivers the actual probing pulse from the Piezo-electric 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: RST-P delivers the same accuracy in all probing directions. Special calibrations are not required for slanted measuring or probing tasks.



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.



Compatible
measuring machines:

CONTURA G2
ACCURA
PRISMO navigator
PRO/PRO T



RST-P

RST-P features a robust, long-lasting, wear-free design and high sensitivity – consistently in all spatial directions.

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 ViSCAN 2D optical probe, it is now possible to perform touch and optical measurements on one machine.

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

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.



Compatible measuring machines:

CONTURA G2
ACCURA
PRISMO navigator
O-INSPECT



ViSCAN

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

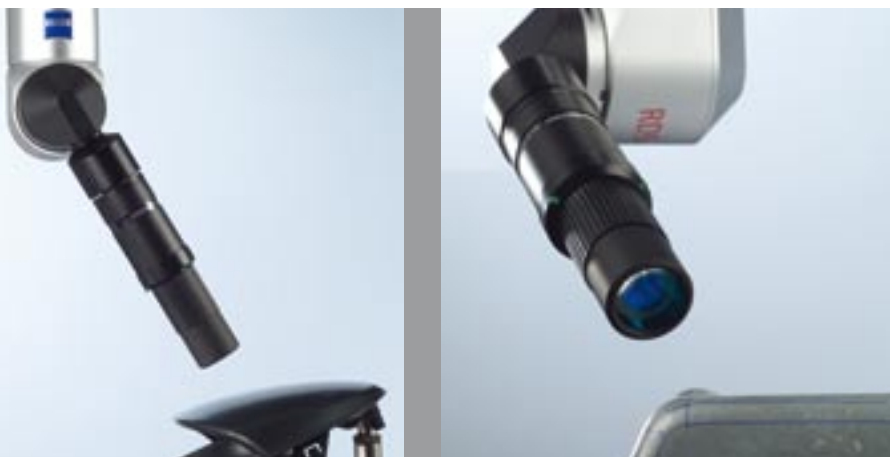
DTS.

Point-by-point optical data capture.

The optical diode stylus works like a contact, touch-trigger single-point stylus, but functions as a non-contact stylus because of its built-in LED diode beam.

With DTS, clamping workpieces is no longer required – deformations are avoided and both soft and sensitive parts such as plasticine, clay, wood, plastics, foam parts, material or lacquered surfaces can be easily probed. Users benefit from fast, easy and safe probing without having to think about contact with the workpiece.

With DTS, the probing direction does not influence the measurement since this sensor is symmetrically designed. Inclined surfaces up to an inclination angle of 70 degrees or an entire spherical section with a sector angle of 140 degrees can also be probed.



**Compatible
measuring machines:**

**CONTURA G2
ACCURA
PRISMO navigator
PRO/PRO T**



DTS

The diode stylus features a compact design and low weight. There are no mechanical wear-and-tear parts and therefore no need for maintenance.

LineScan.

Point clouds at the speed of light.

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.

LineScan is extremely fast: up to 250,000 points per second can be captured for high-speed digitizing. The short measuring times lead to a considerable increase in productivity. CALYPSO measuring software and the automatic sensor change 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 LineScan package includes a scanner, cables, software and extensive databases for sensor orientation, illumination and scanning settings, and workpiece coordinate systems.



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



Compatible measuring machines:

- CONTURA G2**
- ACCURA**
- PRISMO navigator**
- PRO/PRO T**



LineScan

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

VAST XXT.

Scanning the different way.

VAST XXT permits high-accuracy scanning on the RDS articulating probe holder with small dimensions.

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


As a replacement for touch-trigger sensors, 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 design of lightweight scanning sensors on the articulating probe holder requires different sensor modules. With only two modules, VAST XXT covers the typical stylus length ranges for this sensor design. This sensor accepts lateral styli up to 40 mm. It is also suitable for fixed installation.



**Compatible
measuring machines:**

**CONTURA G2
ACCURA
PRISMO navigator**

The ZEISS logo is a blue rectangle with the word "ZEISS" in white, sans-serif capital letters.The ZEISS logo is a blue rectangle with the word "ZEISS" in white, sans-serif capital letters.The VAST XXT logo features the word "VAST" in blue and "XXT" in red, both in a bold, sans-serif font.

VAST XXT

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

DT DynaTouch.

Scoring points with speed.

What makes this single-point probe system so special? DT measures using a very robust, integrated dynamic system, thus making it more reliable and reproducible than traditional single-point systems.

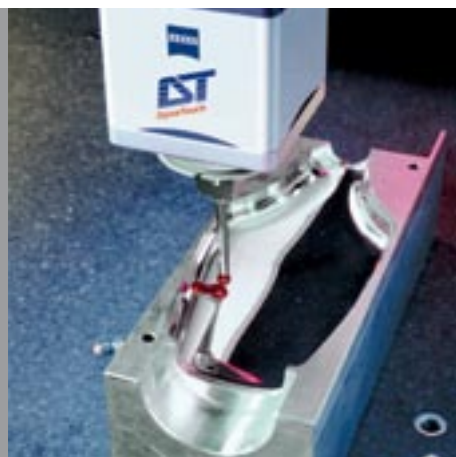
Complex stylus configurations can be flexibly used with DT: the automatic weight compensation enables the installation of heavy styli up to 500 g and even the use of one-sided weights. Deep bores with extensions up to 500 mm can be measured just as easily as tiny features with stylus tips as small as 0.6 mm. DT delivers stable single-point results through multi-point acceptance and the dynamic determination of mean values.

Because the DT sensor is self-centering, it is possible to measure a V-nut, gear or a threaded hole, for example.

When applications require more than single-point measuring, DT can be inexpensively upgraded to VAST XT and thus to scanning. VAST XT fits the same receptacle and permits the same styli combinations and weights.



The stylus adapter and rack are identical; existing measuring programs can be easily used.



**Compatible
measuring machines:**

**CONTURA G2
ACCURA**



DT

The DT DynaTouch six-way probe makes it possible to use different styli in a single configuration. And it is an excellent value for the money.



VAST XT.

**“All systems go”
for active scanning.**

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

VAST XT continually monitors probe deflection. The same low measuring force is generated and regulated by the probe – thus minimizing dynamic influences such as stylus bending.

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

As a result of its high-speed scanning capabilities, VAST XT can complete practically any task: form and length measurements, curve and freeform measurements, and reverse engineering. The applications cover plastic machined parts and Styrofoam, brake components, crankshafts, engine blocks and turbine blades.



**Compatible
measuring machines:**

**CONTURA G2
GageMax navigator
ACCURA**

VAST XT

VAST XT accepts complex and thus heavy stylus configurations: stylus lengths up to 500 mm and stylus weights up to 500 g can be combined with VAST XT.



VAST gold.

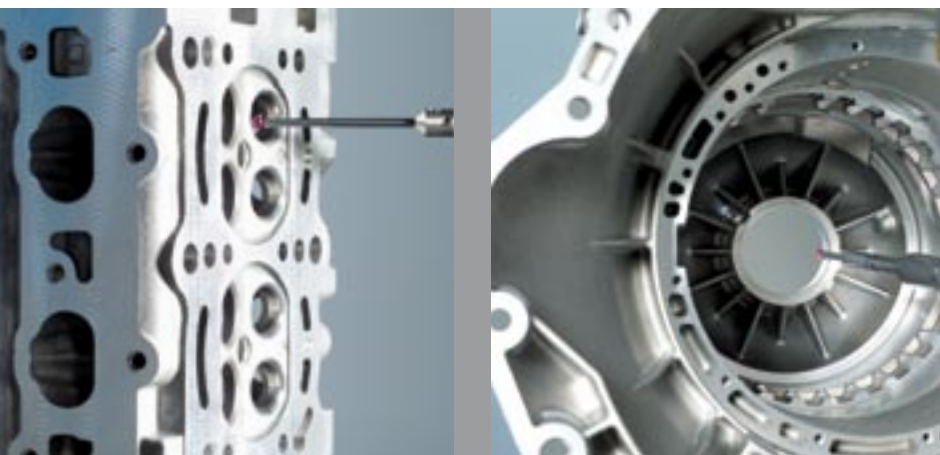
Peak scanning performance guaranteed.

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

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 600 g. Asymmetrical stylus configurations can also be used with VAST gold.

In addition, VAST gold features high scanning speeds up to 300 mm per second with navigator technology, good collision protection for all directions of movement and very high accuracy. 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 1000 milli-newtons.

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



Compatible measuring machines:

**ACCURA
PRISMO navigator
CenterMax navigator
MMZ G, MMZ T**



VAST gold

Size, form and position in one setting on one machine in one reference system – that is VAST gold.

EagleEye Navigator.

**Car body measurement
in sharp focus.**

Quality assurance in car body construction is among the most complex tasks 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 bores is extremely time-consuming work, particularly for serial inspection. EagleEye Navigator leads to time savings of almost 50% for the entire car body. Typical procedures in traditional measuring methods are completely eliminated: no assembly and disassembly of threaded adapters, no material, and storage or handling costs.

Also, the use of EagleEye Navigator immediately reduces reaction times and simultaneously increases the quality of pressed parts. This results in top-quality evaluations of the results with information on the diameter, position and form of the part feature down to the nearest micrometer.

EagleEye Navigator turns your measuring machine into production equipment.



**Compatible
measuring machines:**

PRO/PRO T



EagleEye

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

MSR, MSR mini, ProMax, ProMax light. Extras in the premium segment.

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

MSR, 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 storage locations ensure a high level of flexibility, thus keeping all future system enhancements on the table for operators of ZEISS coordinate measuring machines.

Benefits:

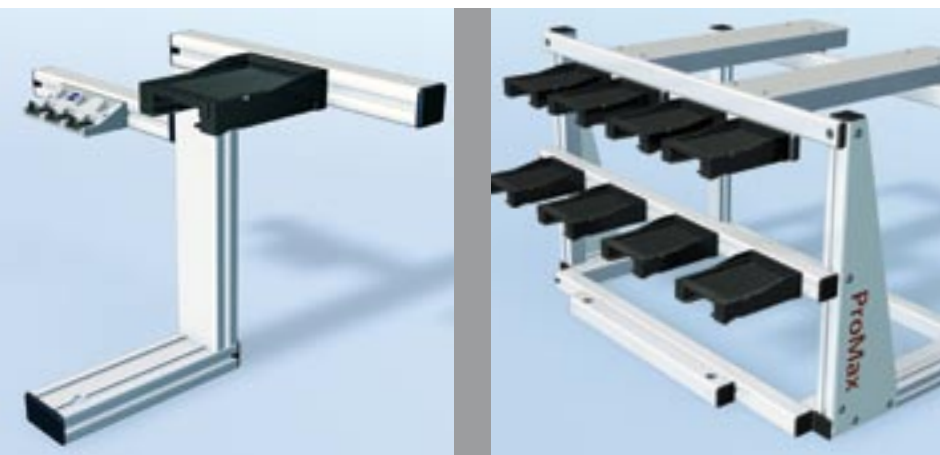
- Flexible assembly of the MSR with all useable stylus and sensor storage locations
- Vertically adjustable assembly level for customized use
- Robust and sturdy design
- Standard: two storage levels, expandable to three levels

ProMax, 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: 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
- ProMax light can be directly used with existing measuring programs without changes
- ProMax light features a robust design and can be configured as easily as the standard rack
- CALYPSO and CMM-OS compatible




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



MSR ProMax

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

RDS				
	 RST-P 	 ViSCAN	 LineScan	 DTS
Design	Touch-trigger single-point sensor	Camera sensor with auto focus	Optical triangulation line sensor	Diode stylus
Probing procedure	Single point	Optical 2D scanning	Optical line scanning	Optical 1D
Probing force*		–	–	–
Probe measuring range		Camera resolution: 768 pixels (horizontal) x 576 pixels (vertical)	25 mm (extended 55 mm)	50 x 70 µm
Probe deflection range		–	–	–
Measuring speed	Single points: up to 1.5 s/point		250,000 points/s (up to 1000 lines/s or 1000 points/line)	
Probe Change Magazine Manual change via software (electromagnetic receptable)	CNC change in conjunction with probe magazine and controller software	CNC change in conjunction with probe magazine and controller software	CNC change in conjunction with probe magazine and controller software	
Sensor extensions	max. 300 mm	–	–	
Stylus weight max. [g]	max. 10 g	–	–	
Stylus length max. [mm]	max. 90 mm	–	–	
min. sphere diameter [mm]	0.5 mm		–	
Working distance	–	75–90 mm	75 mm (extended 83 mm)	40 mm
Resolution	–	6.0 µm x 6.0 µm pixel size	12.5 µm; linearity in z: ±50 µm	
Laser class	–	Illumination equipment is also laser class	2M (no special protective measures)	2
Line width	–	–	max. 20 mm (extended 46 mm)	

Sensors



RDS

Measuring machine

CONTURA G2

ACCURA

PRISMO navigator

GageMax

CenterMax

PRO/PRO T

MMZ G, MMZ T

	RST-P	ViSCAN	Line Scan	DTS	VAST XXT	DT	VAST XT gold	VAST gold	EagleEye
CONTURA G2	●	●	●	●	●	●	●		
ACCURA	●	●	●	●	●		●	●	
PRISMO navigator	●	●	●	●	●			●	
GageMax							●		
CenterMax								●	
PRO/PRO T									●
MMZ G, MMZ T								●	

VAST XXT



DT



VAST XT gold



VAST gold



EagleEye



Passive scanning sensor

Active single-point sensor

Active scanning sensor

Active scanning sensor

Optical triangulation line sensor

Single-point, scanning

Single-point, self-centering measuring

Single-point, self-centering scanning, navigator capable

Single-point, self-centering scanning, navigator capable

Self-centering optical line scanning, navigator capable

Depends on stylus length:
0.01 – 0.13 N

Continuous from 0.05 to 1 N

Continuous from 0.05 to 1 N

Continuous from 0.05 to 1 N

–

+/-0.5 mm

+/-1.5 mm

Up to ±0.3 mm with VAST 1
Up to ±1.0 mm with VAST 2

Up to ±0.3 mm with VAST 1
Up to ±1.0 mm with VAST 2

max. ±3 mm

max. ±2 mm

max. ±2 mm

max. ±3 mm

Single point: up to 1.8 s/point
Scanning up to 150 points/s

Single points: up to 2 s/point

Single point: up to 2 s/point
Scanning up to 200 point/s

Single point: up to 2 s/point
Scanning up to 300 points/s

CNC change in conjunction with probe magazine and controller software

CNC change in conjunction with probe magazine and controller software

CNC change in conjunction with probe magazine and controller software

CNC change in conjunction with probe magazine and controller software; RST-T via active interface changeable

CNC change in conjunction with probe magazine and controller software

max. 100 mm

–

–

–

max. 10 g

max. 500 g

max. 500 g

max. 600 g

max. 250 mm with TL 2

max. 500 mm

max. 500 mm

max. 800 mm

0.6 mm with TL 2

0.6 mm

0.6 mm

0.3 mm

0.3 mm with TL 1

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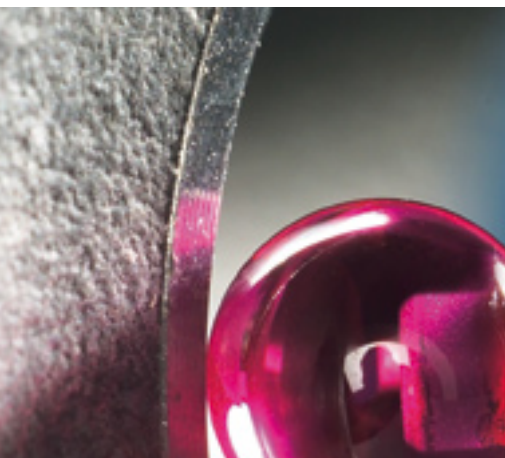
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