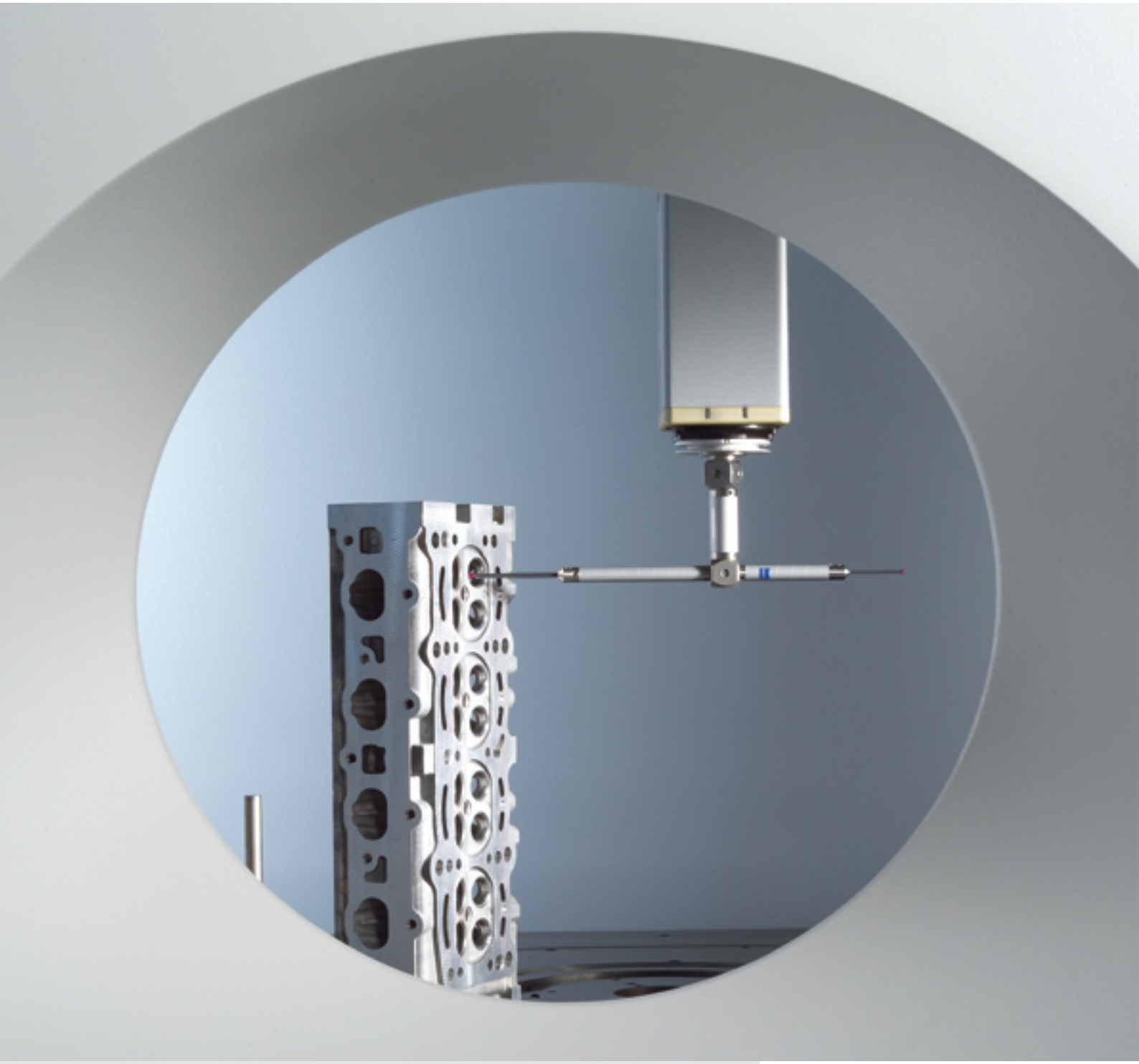
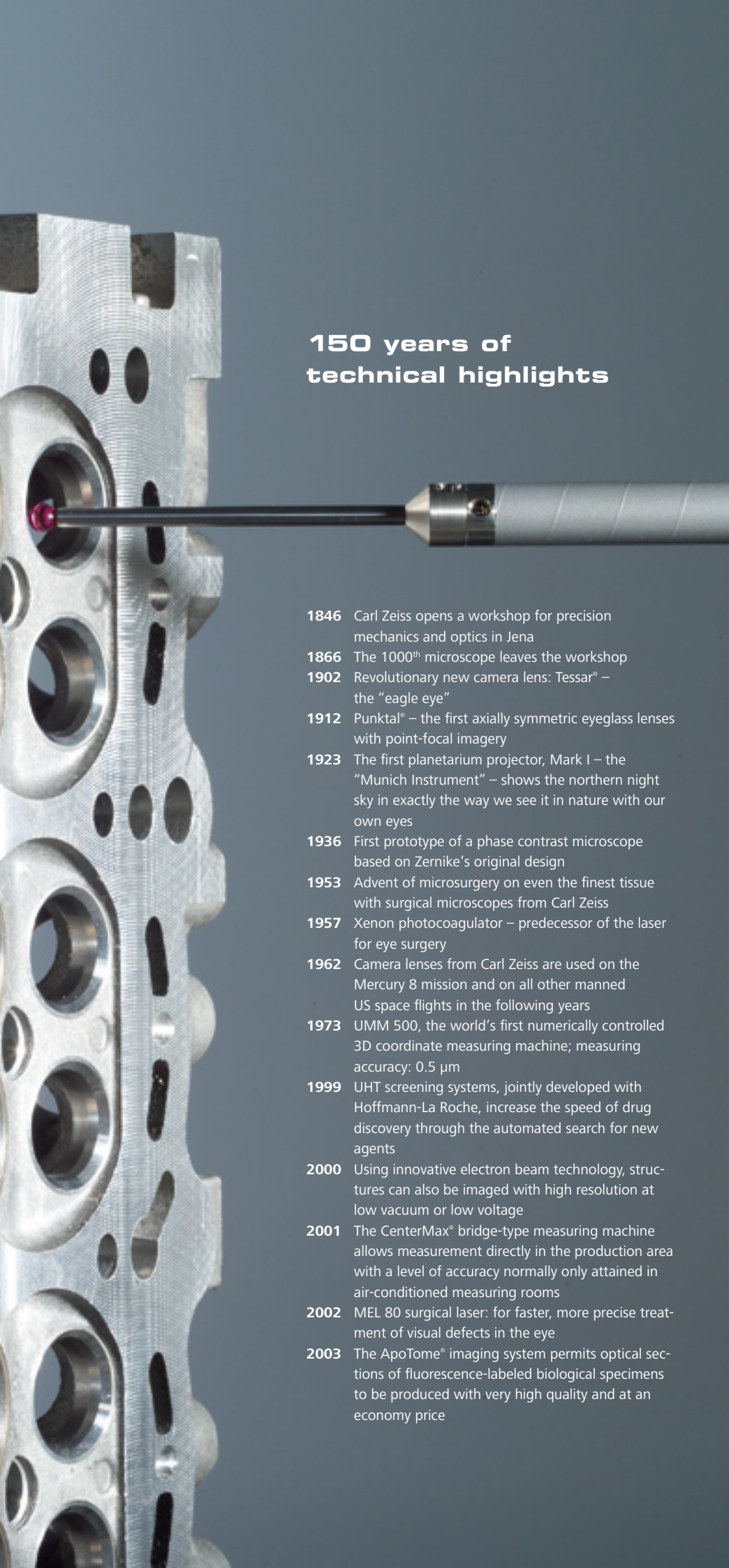
Industrial Metrology in Focus

General overview



We make it visible.



150 years of technical highlights

1846 Carl Zeiss opens a workshop for precision mechanics and optics in Jena

1866 The 1000th microscope leaves the workshop

1902 Revolutionary new camera lens: Tessar® – the "eagle eye"

1912 Punktal® – the first axially symmetric eyeglass lenses with point-focal imagery

1923 The first planetarium projector, Mark I – the "Munich Instrument" – shows the northern night sky in exactly the way we see it in nature with our own eyes

1936 First prototype of a phase contrast microscope based on Zernike's original design

1953 Advent of microsurgery on even the finest tissue with surgical microscopes from Carl Zeiss

1957 Xenon photocoagulator – predecessor of the laser for eye surgery

1962 Camera lenses from Carl Zeiss are used on the Mercury 8 mission and on all other manned US space flights in the following years

1973 UMM 500, the world's first numerically controlled 3D coordinate measuring machine; measuring accuracy: 0.5 µm

1999 UHT screening systems, jointly developed with Hoffmann-La Roche, increase the speed of drug discovery through the automated search for new agents

2000 Using innovative electron beam technology, structures can also be imaged with high resolution at low vacuum or low voltage

2001 The CenterMax® bridge-type measuring machine allows measurement directly in the production area with a level of accuracy normally only attained in air-conditioned measuring rooms

2002 MEL 80 surgical laser: for faster, more precise treatment of visual defects in the eye

2003 The ApoTome® imaging system permits optical sections of fluorescence-labeled biological specimens to be produced with very high quality and at an economy price

Carl Zeiss Business Groups

The six business groups of Carl Zeiss are each responsible for their own operations within the Group.

Semiconductor Technology

The main products of Carl Zeiss SMT AG (Semiconductor Manufacturing Technology) are lithography optics for the wafer steppers and wafer scanners of its partner ASML. Furthermore, the company's product line includes optical components and sub-systems for lithography lasers and synchrotron optics.

Medical Systems

Products from the Medical Systems Group are used in ophthalmology, ENT and neurosurgery as well as in doctor's offices. The product offering extends from surgical microscopes to visualization and documentation systems up to diagnostic and therapeutic instruments.

Microscopy

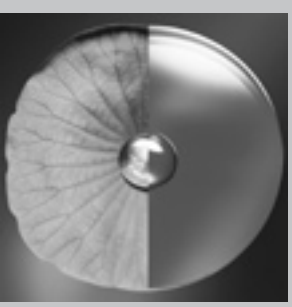
The Microscopy Business Group provides biomedical research, healthcare and the pharmaceutical industry with light microscopes, optical readers, systems for image processing and documentation, laser scanning microscopy and fluorescence correlation spectroscopy.

Industrial Metrology

The product line of technology leader Carl Zeiss Industrielle Messtechnik GmbH includes bridge-type and horizontal-arm measuring machines, as well as measuring machines to capture form, contour and surfaces. Carl Zeiss continually sets new benchmarks for the use of measuring machines on the shopfloor.

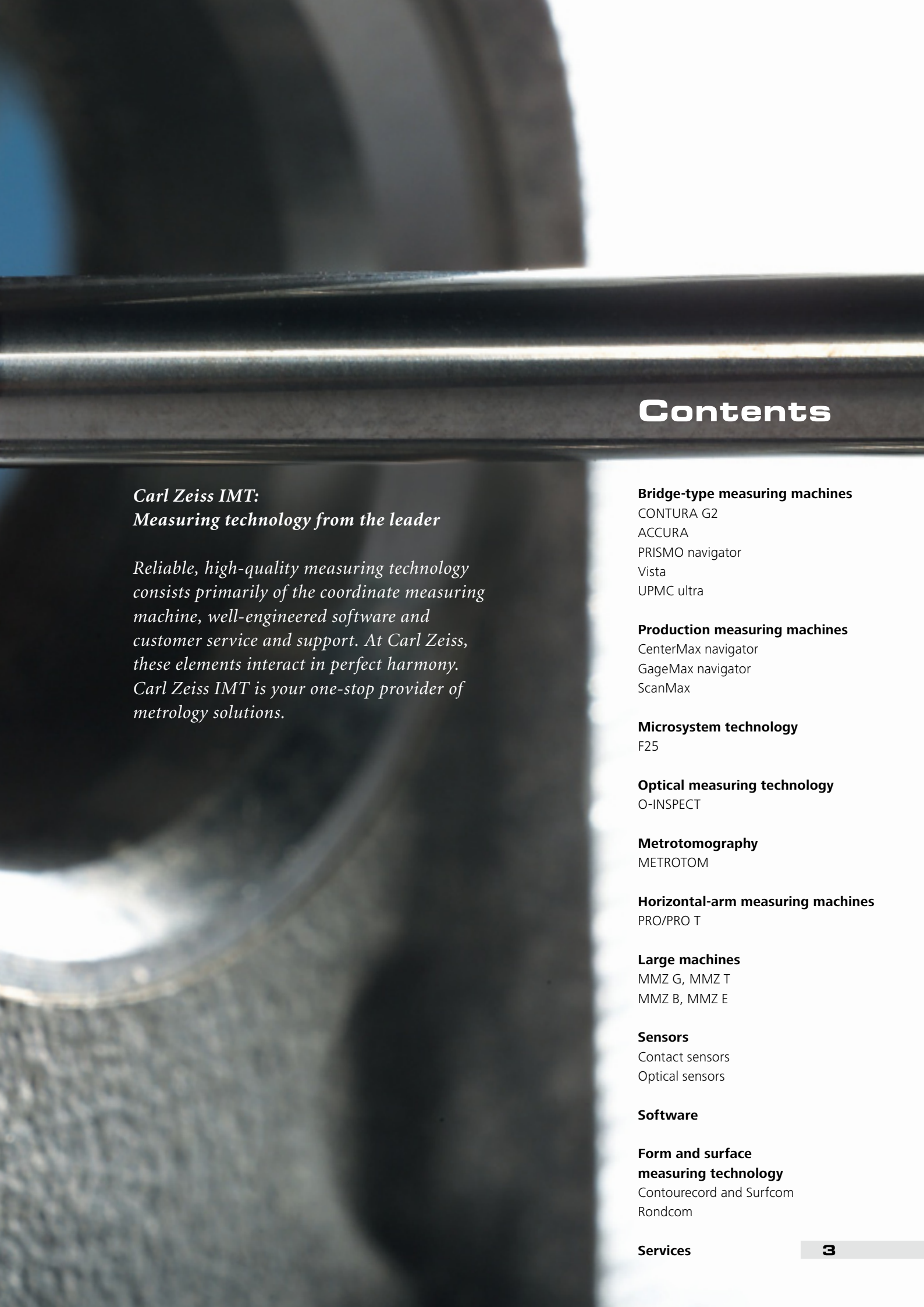
Optoelectronic Systems

This group deals with optics for movie and still photography, optical modules for digital projection, optoelectronic products and sub-systems, and planetariums.



Consumer Optics

Carl Zeiss provides the ophthalmic sector with eyeglass lenses and systems for eyeglass consultations and adjustment. Carl Zeiss Vision International GmbH is the no. 2 supplier on the global eyeglass market. An additional important segment of consumer optics is Sports Optics which manufactures binoculars and hunting optics.



Contents

Carl Zeiss IMT:
Measuring technology from the leader

Reliable, high-quality measuring technology consists primarily of the coordinate measuring machine, well-engineered software and customer service and support. At Carl Zeiss, these elements interact in perfect harmony. Carl Zeiss IMT is your one-stop provider of metrology solutions.

CONTURA G2.

One for everyone

The affordable CONTURA G2® is ideal for small and mid-sized companies wanting the benefits of high-speed scanning. VAST® scanning technology enables form inspections at maximum speed with high-quality measuring results. Process changes are detected at an early stage, high production quality is ensured and rejected parts are reduced.

Key features

Robust machine design

- Ceramic guideways in X and Z provide rigidity and protection against production-related environmental influences
- Air bearings on all axes for high stability at high travel speeds

Machine technology

- CONTURA G2 direkt: entry-level scanning technology from Carl Zeiss; equipped with the VAST XXT scanning sensor that can measure a variety of workpieces
- CONTURA G2 RDS: scanning of features in all angular positions with VAST XXT on the flexible ZEISS RDS articulating probe
- CONTURA G2 aktiv: self-centering probing, multi-point measurement of deeper features and reliable measurement of displaced features with size, form and position results also with high throughput thanks to the flexible VAST XT

Options

- Integrated sensor changer rack for maximum reproducibility without recalibration
- HTG version for the same accuracy over a larger temperature range
- Expansion of the Z measuring range by 200 mm with the U-shaped granite table option

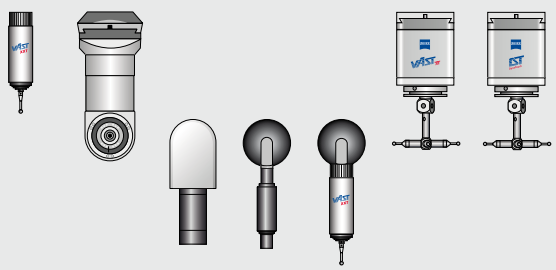
CONTURA G2: affordable high-end measuring technology in a small size.

Dimensions

	Measuring range X x Y x Z [mm]	Linear measuring tolerance [µm]
CONTURA G2	700 x 700 (1000) x 600	1.8 + L/300
	1000 x 1200 – 2100 x 600	1.9 + L/300
	1000 x 1200 – 2100 x 600 (U-shaped granite table)	1.9 + L/300

L = measuring length in mm

Sensor system



ACCURA.

The multi-capable CMM of quality assurance

ACCURA® is known for high-precision measurements in all multi-sensor disciplines using the ZEISS RDS. This measuring machine allows you to use the measuring method best suited for your measuring task. ACCURA is the affordable solution for the measuring lab and inline use. Active scanning with VAST® technology and an automatic stylus rack system increases flexibility and productivity when determining size, form and position.

Key features

- Designed for very high precision, thus delivering fast and highly accurate measuring results at the same time
- All measuring technology is united in one machine which enables the use of the respectively ideal method

Machine technology

Carl Zeiss quality throughout

- Extremely rigid light bridge made of thermally insensitive materials
- All axes with 4-side air bearings
- Pre-cabled for touch and optical sensors, as well as scanning, thus making it immediately multi-sensor capable

Fully enclosed X axis and Y drive axis

- Glass ceramic scales with patented, thermally neutral frame
- Passive elastomer vibration damping

Options

- RST-P, DT, VAST XXT, VAST XT gold and VAST gold for single-point measuring and scanning
- ViSCAN, DTS and LineScan for non-contact measuring tasks
- Modular magazine technology combined with an automatic stylus rack

mass

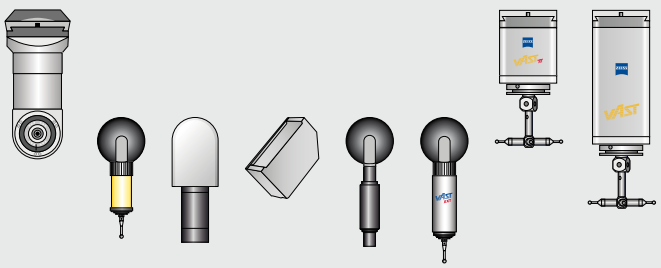
multi application sensor system

ACCURA is part of the mass-concept – the all-in-one strategy of measuring technology from Carl Zeiss that incorporates the increasing need for multifunctional machines. Today, measuring machines need to be able to measure using optical scanning and contact sensors. The solution is ACCURA.

Dimensions

	Measuring range X x Y x Z [mm]	Linear measuring tolerance [µm]	
ACCURA 5 (7)	700 x 900 x 500 (700)	1.6 + L/333	
ACCURA 7	900 x 1200 – 2400 x 700		
ACCURA 10	1200 x 1800 – 4200 x 1000	X = 1200	2.2 + L/300
		X = 1600	3.2 + L/250
	1600 x 2400 – 4200 x 1000	3.5 + L/250	
ACCURA 14	1600 x 2400 – 4200 x 1400	L = measuring length in mm	

"mass" sensor system



PRISMO navigator.

The lightning-fast all-rounder

PRISMO is number one in the world for high-speed scanning in production. Accuracy, speed and outstanding resistance to ambient conditions are the trademarks of this measuring machine.
The VAST® universal probe for multi-point or single-point measuring is used on PRISMO navigator and adjusts to each measuring task and quickly determines size, form and position in a single measuring run.

Key features

The precise result as fast as possible

- All components support maximum precision during high-speed scanning
- Also suitable for use on the shop floor
- ISC control provides high reliability and optimal controller action
- With VAST navigator, measuring times are reduced to an absolute minimum

Machine technology

- Extremely rigid, laterally driven light bridge
- Table covers as well as fully enclosed X axis and Y drive axis
- Glass ceramic scales
- Passive elastomer vibration damping
- S-CAA and D-CAA to compensate for static and dynamic bending effects

Options

- Integration of a rotary table as the 4th axis
- Use of palletizing and loading systems
- Accept® enclosure for inline use

mass

multi application sensor system

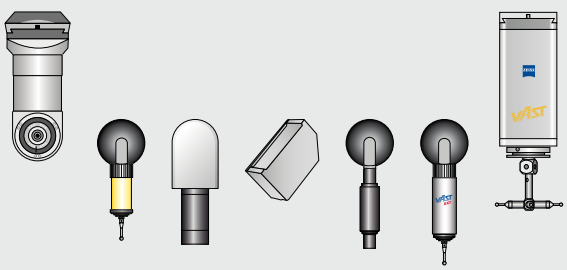
PRISMO is also included in the mass concept that incorporates the increased need for multifunctional measuring machines. PRISMO thus enables both contact and optical measurements.

Dimensions

	Measuring range X x Y x Z [mm]	Linear measuring toleance [µm]	
		(5, 7) VAST Gold HTG	
5 (7)	700 x 900 x 500 (650)	1.4 + L/333	
7	900 x 1200 – 2400 x 650		
10	1200 x 1800 – 4200 x 1000	(10) X = 1200	X = 1600
	1600 x 2400 – 4200 x 1000	1.8 + L/300	2.9 + L/300
14	1600 x 2400 – 4200 x 1400	3.2 + L/300	

L = measuring length in mm, single Y measuring ranges have different linear measuring tolerances, S-ACC version with linear measuring tolerance of up to 0.9 + L/300 available. Specifications for 15-30 °C available.

"mass" sensor system



Vista.

Measuring convenience in a small size

This small, shopfloor-oriented measuring machine provides the best means of getting into the world of coordinate metrology. It offers high reliability, accuracy and purchasing and operating costs. Vista® is particularly well-suited for single or volume measurements of small to mid-sized parts in production and is available as a motorized or CNC version. The ergonomic design allows the user to sit comfortably and close to the workpiece. Vista® requires very little space allowing it to fit in most every work environment.

Key features

Configurations

- Available as a manual or CNC measuring machine
- Easy-to-use controller and programming features, as well as three-axis travel in the CNC version with a joystick

Ergonomic design

- Minimal space requirements make it very easy to set up
- Axis locks and fine adjustment within easy reach
- Fast locking of the Z axis to rapidly change the probe

Machine technology

Friction drives

- Enable fast acceleration and high speeds during CNC operation

Accuracy over a wide range of temperatures

- Crossbeam and spindle made from pore-free ceramic material
- Air bearings on all four sides of the Y axis for additional rigidity and stability

Computer-aided accuracy

- Uses the same CAA technology as high-accuracy measuring machines

Options

Application software for every need

- Calypso®: the CAD interactive software for Windows
- U-Soft solid: computer-based software for easy operation and high performance – even for inexperienced users
- HOLOS: to measure standard geometric forms and freeform surfaces

Vista combines an ergonomic design and features for outstanding measuring performance.

Dimensions

	Measuring range X x Y x Z [mm]	Linear measuring tolerance [µm]
Vista CNC	400 x 500 x 350	2.4 + L/300
MOT	400 x 500 x 350	2.9 + L/250

L = measuring length in mm

Sensor system

PH6

MIH

TP6

TP20

TP200

UPMC ultra.

Ultra-high precision

With an extremely low measuring uncertainty, the UPMC ultra is particularly well-suited for maximum precision measurements in research, development and quality assurance, as well as for the calibration of gages and test pieces. Additionally, the UPMC ultra bridge-type measuring machine is ideal for precision measurements throughout 3D metrology, for measuring prototypes and volume parts, planes and spatial curves.

Key features

Measurements in extreme ranges

- CNC-controlled, high-precision measuring machine with bridge-type central drive for acceleration-free measuring and constant precision throughout the measuring range
- Thermally insensitive scales in the CARAT® version
- Servo drives for electronic monitoring of the drives and shearing force limitation in all axes

Foundation for maximum precision

- Fine CAA and S-CAA for guideway error correction and position-dependent bending correction of the machine rigidity
- Table plate bending compensation

Machine technology

- Active scanning to capture very large quantities of data
- Automatic decision-making aids, graphic user guidance and efficient interfaces between the operator and measuring machine
- Simultaneous determination of size, form and position
- Function-oriented inspection with a ring gage or mandrel

Options

- Attached rotary table as 4th axis

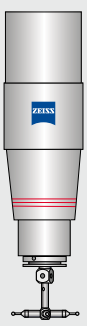
UPMC ultra meets the highest demands on precision.

Dimensions

	Measuring range X x Y x Z [mm]	Linear measuring tolerance [µm]
UPMC ultra	850 x 1150 x 600	0.3 + L/1000

L = measuring length in mm

Sensor system



CenterMax navigator.

Unparalleled stability

CenterMax® navigator fits smoothly into any production line and withstands all production environments: neither extreme temperature fluctuations nor typical floor vibrations affect its precision. Even large workpieces are no problem for CenterMax – it can accept weights up to 1000 kg. The open design permits three-sided loading.

Key features

- Production measuring center with third generation high-speed scanning technology for high data density and reliable measuring results
- Computer-aided error correction of the axes of motion increases precision
- Sturdy construction as a result of the machine base consisting of cast mineral technology
- Ideal for use directly in a production environment as a result of extreme resistance to temperature fluctuations

Machine technology

- Temperature-resistant frame technology combines insulating and damping cast mineral with invar elements to ensure insensitivity to temperature fluctuations.
- Fully enclosed measuring axes on air bearings for maximum precision and resistance to dirt
- Active vibration damping eliminates the negative effects of floor vibrations on the measuring result

Options

- Ultra configuration enables added accuracy for applications in the measuring lab
- Granite or universal table permits adjustment to changed production conditions

The CenterMax navigator universal coordinate measuring machine is ideal for economical measuring both on the shopfloor and in the measuring lab.

Dimensions

	Measuring range X x Y x Z [mm]	Linear measuring tolerance [µm]
CenterMax navigator	1100 x 1200 x 900	20 °C: 1.4 + L/300 22 °C: 1.5 + L/290 28 °C: 1.8 + L/260 40 °C: 2.4 + L/200
CenterMax navigator ultra	900 x 1200 x 700	19 – 21 °C: 0.6 + L/600

L = measuring length in mm

Sensor system

GageMax navigator.

Compact flexibility

The GageMax® CNC production center replaces fixed gages in the innovative machining, and cutting and reshaping industry – and measures the entire range of parts in the process. In addition, it guarantees maximum precision in a production environment. The foundation for this is the computer-aided accuracy correction of the axes of motion and the insensitivity to dirt as a result of the fully enclosed machine axes.

Key features

Measurements directly in production
- Exceptionally sturdy and resistant to temperature changes
- Very high measuring accuracy and optimum productivity under production conditions

Economical
- Minimal space requirements
- No air-conditioned measuring lab required
- Replaces gages as well as measuring and testing equipment
- 30% lower life cycle costs

Optimum flexibility
- Can be easily moved when production conditions change

Machine technology

Enclosed 3D box
- Ideally designed to protect against environmental influences, easy to service
- Insensitive to temperature changes

Sturdy design
- Special linear guideways
- Highly dynamic drives with 520 mm/s travel speed and 3.5 mm/s² acceleration
- Insensitive to vibrations

Options

Rotary table as integrated 4th axis
- To measure rotational parts

Integration into automation systems
- Use of palletizing and loading systems

More flexible operation and use
- Control panel accessories and features
- Extensive computer and system equipment options
- Various software options

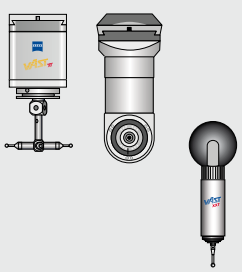
Sleek, compact and maximum flexibility – GageMax is the ideal coordinate measuring machine for a wide range of workpieces.

Dimensions

	Measuring range X x Y x Z [mm]	Linear measuring tolerance [µm]
GageMax navigator	750 x 500 x 500	20 °C: 2.2 + L/300 28 °C: 2.6 + L/260 32 °C: 2.8 + L/240 40 °C: 3.2 + L/200
GageMax RDS	750 x 500 x 500	

L = measuring length in mm

Sensor system



ScanMax.

In the center of the action

Because ScanMax® was designed for use in production, harsh conditions do not influence measurement quality. Whether a design model, standard geometries or a statistical evaluation – ScanMax always measures highly precisely and reliably. And: ScanMax is only available with scanning. Above all: the more points that are captured, the more precise the measurement and the more reliable the measured values.

Key features

- Intelligent gage for the shopfloor and pre-production
- Permits manual scanning directly next to the machine tool for the complete capture of complex workpiece surfaces
- High measuring accuracy at ambient temperatures of 15 – 30°C
- Patented correction processes ensure absolute precision directly in production
- Low space requirements with added flexibility

Machine technology

- Fully enclosed measuring systems ensure insensitivity to rough environmental conditions
- More resistance to bending and better temperature stability through the use of carbon-fiber reinforced plastic for the articulated arm
- Highly dynamic servo drive enables electronic monitoring of the drives and shearing force limitation

Options

- Optional rotary tilting table allows you to move and rotate the coordinate system for unlimited 3D measurements
- Equipped with wheels for easy transport
- Inherently stable base for additional vibration damping

ScanMax guarantees precision with ambient temperatures typical of production environments.

Dimensions

	Measuring range X x Y x Z [mm]	Linear measuring tolerance [µm]
ScanMax	850 x 400 x 450	5.0 + L/50 2.9 + L/50 (HG Version)

L = measuring length in mm

F25.

Measuring nanometers

With the F25 coordinate measuring machine, Carl Zeiss offers a system that meets the extreme demands of quality assurance for size, form and position of microsystem parts. Microsystem components are used in automotive and medical parts. They are essential for highly accurate control processes. Their reliability is determined by the precision with which quality assurance ensures the function of these tiny parts.

Key features

- The ultra-precise kinematics combined with the highly accurate measuring system enable measuring uncertainty of 250 nm at a resolution of 7.5 nm
- Time-tested CALYPSO measuring software used on other large coordinate measuring machines

Machine technology

- Flexible measuring with multi-sensor technology: contact and optical measuring with one system
- Contact, passive measuring scanning sensor based on silicon-chip technology with integrated Piezo-resistive elements
- ViSCAN camera sensor based on an objective lens used in ZEISS microscopy for 2D measurements
- An additional camera aids visualization during probing and simplifies learn programming.

Options

- Sensitive 3D micro-stylus for stylus diameters of 50 – 500 µm and stylus tip diameters of 100 – 700 µm

Whether micro-motors, micro-switches or other tiny components – every micro-part can be highly accurately measured with the F25.

	Dimensions	
	Measuring range X x Y x Z [mm]	**Linear measuring tolerance [µm]**
F25	100 x 100 x 100	0.250 + L/666

L = measuring length in mm

Sensor system
3D micro stylus
ViSCAN F25

O-INSPECT.

Fusion of the best

O-INSPECT combines the best from measuring technology with the best from optics: it is equipped with a contact and an optical sensor. O-INSPECT is the ideal solution for applications in the plastics industry, medicine and automotive technology and in precision mechanics – always when a large number of components have to be measured quickly with high accuracy.

Key features

Proven design principle

- Bridge-type measuring machine with rigid bridge and moveable table for high accuracy and optimum accessibility

Premium basic configuration

- Standard configuration with multi-sensor technology
- VAST® contact scanning and optical measuring in one machine

Machine technology

Reliable drive technology

- Precision roller bearings in all axes
- Highly dynamic drives and automatic drive monitoring
- Compensation of guideway errors (CAA corrected)

Ideally equipped for inline measuring

- Completely covered guideways
- Integrated damping

Field-tested components

- ZEISS VAST XXT scanning sensor for contact measuring
- ZEISS zoom lens for optical measuring
- In-house machine components relevant to precision

Sensors

Discovery zoom lens from Carl Zeiss

- Optical 2D camera sensor with image processing functionality
- Optical system with lenses from Carl Zeiss
- 12x zoom lens, image field (mm): 1 x 1 – 12 x 12
- Unique illumination with red and blue light, segmenting possible

VAST XXT scanning sensor

- Passive measuring probe for single-point probing and scanning
- Stylus receptacle for CNC-guided stylus change
- Lateral styli up to 40 mm, styli in three directions

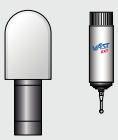
Plugs no larger than a few millimeters, cellphone cases, implants – O-INSPECT is a true all-rounder and easily masters every measuring task.

Dimensions

	Measuring range X x Y x Z [mm]	Linear measuring tolerance [µm]
O-INSPECT	400 x 400 x 200	1.9 + L/250

L = measuring length in mm

Sensor system



METROTOM.

The Revolution in Metrology

Metrotomography® is the fusion of metrology and tomography. It is now possible to measure highly precisely and non-destructively in areas where only destructive inspection was possible before or no quality assurance took place at all.

Metrotomography allows you to measure the interior of a workpiece: all recorded data can be applied to all areas of quality assurance and be evaluated. Non-destructive testing technology, such as assembly inspection, damage and porosity analysis, material inspection and defect checks is possible as well as traditional evaluation, reverse engineering applications or a comparison of geometries.

Key features

Well thought-out design

- 3D computed tomography with micro-focus x-ray tubes and detectors
- Rotary table for clamping device and Mover from Carl Zeiss

Safe technology

- Full-protection enclosure
- Meets radiation protection ordinance in accordance with DIN 54113 for full-protection devices (0.5 mr/h on external skin) of this type
- Ergonomically optimized design (special loading position)

Machine technology

Proven linear technology

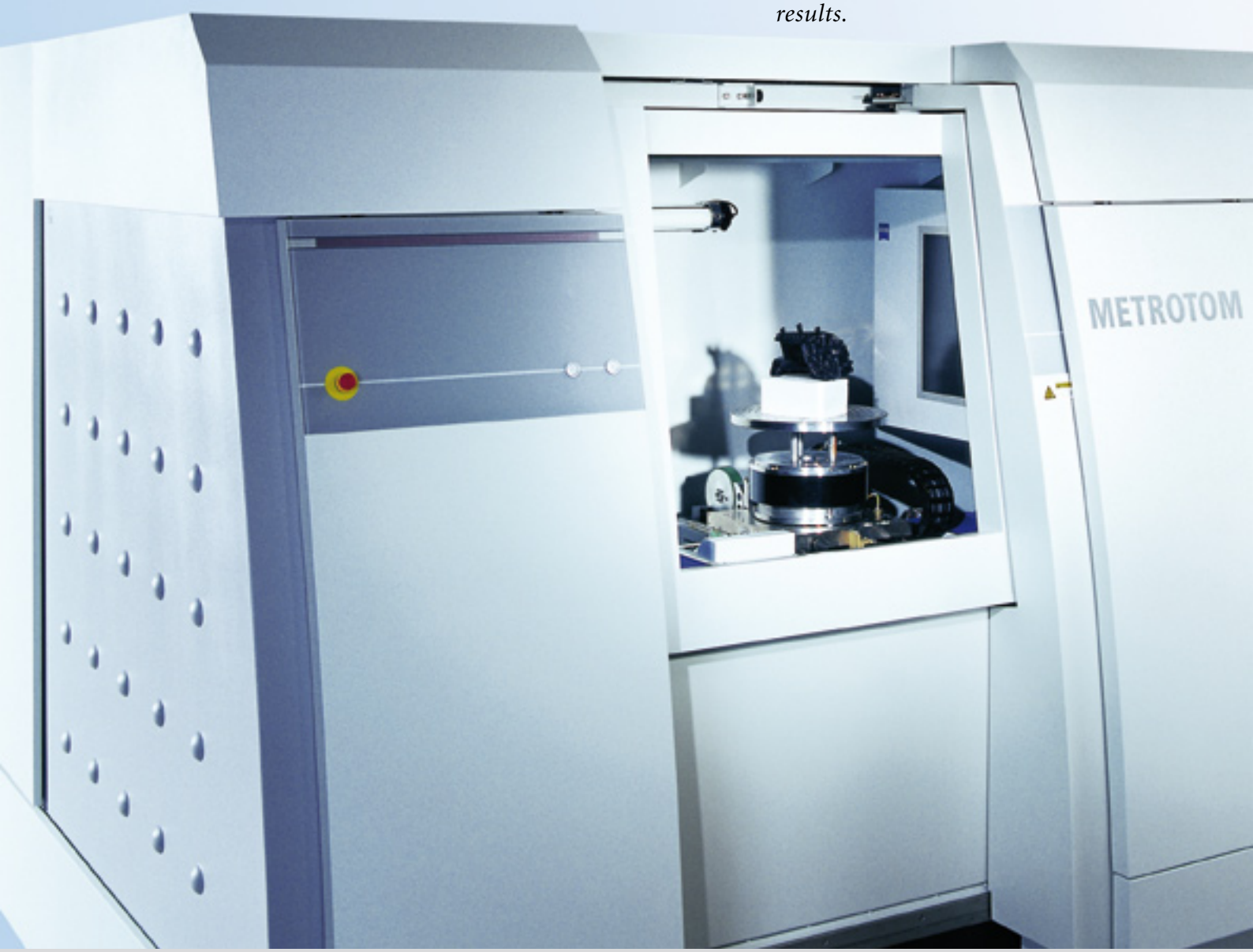
- In-house machine components relevant to precision
- Compensation of guideway errors (CAA corrected)
- Original Carl Zeiss rotary table with direct drive
- In-house air bearings
- Resolution: 0.036″
- Max. load (centric): 500 N

Sensor

Micro-focus x-ray tubes

- High voltage: 10 – 225 keV
- Tube power: 5 – 3000 µA
- Target performance: 320 W max.
- Angle of reflected beam: 50° conical
- Angle of useful beam: 30° conical
- Size of focal point: > 7 µm flatbed detector
- Detector system with extremely high sensitivity
- 1024 x 1024 pixels at 400 µm² for 3D-CT
- Low distortion, digital radioscopy

Metrotomography now quickly and clearly shows the defects in areas where previously either an inspection was not possible, or very time-consuming and costly cross sections were the only means of ascertaining the required results.



	Dimensions
	Measuring range Ø x Z [mm]
METROTOM	300 x 300

L = measuring length in mm

PRO and PRO T.

Productive in production

PRO and PRO T are universal measuring machines for the automotive and supplier industries. They are ideal for the initial batch of parts up to analysis – from the first sheet to the first tool, from the cubing model to a complete car body. The machine design of the PRO line is based on a completely new platform strategy with a modular design. The most important features: very high speeds without a loss of measuring accuracy and error-free adjustment to changed production requirements.

Key features

Bionic design construction
- Unique trapezoidal design of the Y and Z axes for unparalleled rigidity
- Separation of the basic mechanical structure and guideways for more efficient and economical maintenance

PRO Platform
- Modular design for optimum adaptation to the range of tasks and investment levels
- RDS-CAA articulating probe holder

Machine technology

Linear guideway in all three axes
- For high accuracy, speed and long-term stability
- Permits travel speeds up to 866 mm/s and acceleration up to 1500 mm/s²

PRO: measuring beam with large cross section and three-point bearing
PRO T: (floor version) lateral guideway on own rigid measuring plate

Options

Easy-to-use, precise software
- Possible to operate with CMM-OS or DME® control software
- Connection to non-ZEISS software possible
- Teleservice for onboard diagnostics, software upgrades and user support

Optimized sensors
- Adaptation of different stylus systems possible depending on the PRO or PRO T version
- High-end option for PRO/PRO T premium: EagleEye navigator laser-line triangulation stylus

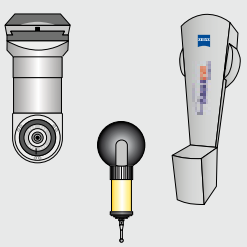
Maximum output and minimum costs for the entire product line are the result of the modular design of PRO and PRO T.

Dimensions

	Measuring range X x Y x Z [mm]	Linear measuring tolerance [µm]
compact	5000 – 10000 x 1600 x 2100 – 3000	30 + L/70 ≤ 80
select	5000 – 10000 x 1600 x 2100 – 3000	25 + L/100 ≤ 60
premium	5000 – 10000 x 1600 x 2100 – 3000	25 + L/100 ≤ 60
	Optional high accuracy PRO T	
		18 + L/125 ≤ 50

L = measuring length in mm

Sensor system

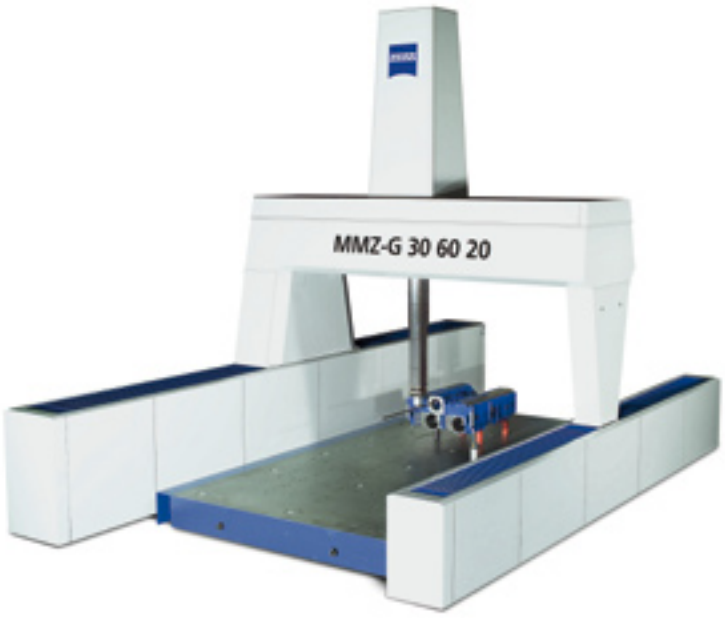


TP 6
TP 20
PH10M
MIH

MMZ G, MMZ T.

Outstanding measuring performance

There is room for precision even where heat and dirt cannot be avoided: with the MMZ G and MMZ T machine measuring centers. They are tailored for precise, economical measuring of large parts directly in the production environment. Furthermore, because these measuring centers can be loaded from three sides with a crane or floor conveyors, they are ideal for the conditions in production.



Key features

Designed for measurements of highly precise machine parts

- Traditional bridge-type machine construction for high accuracy, measuring performance and resistance to ambient conditions
- Roller bearings increase resistance to rough environmental conditions without compromising the superb guideway characteristics
- CAA error correction of the axes of motion

Control and operation

- Highly integrated ISC control technology
- Variable speed control during CNC operation
- Prepared locking device with crane control to load workpieces

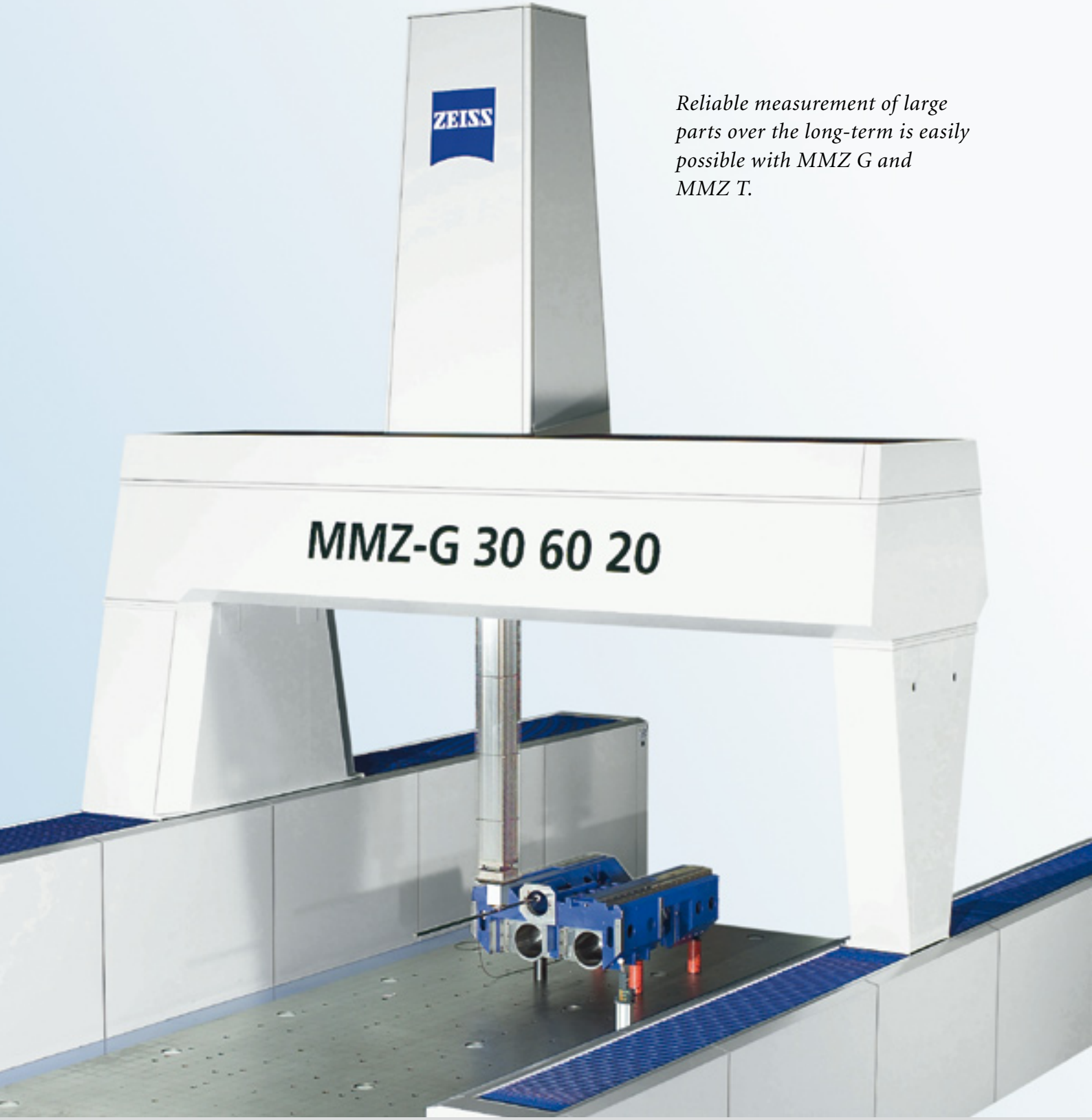
Machine technology

- Peak performance during active scanning with VAST® gold standard probe, even with large styli
- Software assistant to automatically determine the fastest possible scanning speed
- Complete collision protection of the quill

Options

- VAST navigator for high result quality with a short measuring time
- Optimization functions for probe movement
- Outstanding measuring flexibility with use of VAST and RDS

MMZ



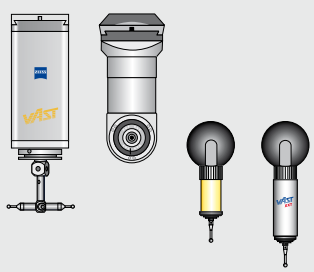
Reliable measurement of large parts over the long-term is easily possible with MMZ G and MMZ T.

Dimensions

	Measuring range X x Y x Z [mm]	Linear measuring tolerance [µm]
		18 – 22 °C
MMZ G 2000	2000 x 3000 – 5000 x 2000	2.8 + L/40
MMZ G 2500	2500 x 3000 – 6000 x 2000	3.2 + L/400
MMZ G 3000	3000 x 4000 – 6000 x 2000	3.5 + L/400
MMZ T 12	1600 x 2400 (3000) x 1200	2.0 + L/300
MMZ T 16	1600 x 2400 (3000) x 1600	3.0 + L/300
	2000 x 3000 x 1600	3.2 + L/300

L = measuring length in mm

Sensor system



MMZ B, MMZ E.

Class acts

How do you precisely measure large engineering, automotive and aerospace components, as well as communication and satellite equipment? This is best accomplished with the flexible MMZ B and MMZ E machine measuring centers. The open design of these measuring machines and the ability to measure on both sides of the Y axis enables you to quickly and easily measure large parts.

Key features

- Flexible line of gantry measuring machines with a large measuring range
- Accuracy, speed and reproducibility with optimum reliability even on the shopfloor
- Easy placement of the parts and unimpeded access to the measuring range
- Integration of loading systems
- Superior metrology and dynamic properties

Machine technology

Raised guideways

- Increases resistance to dirt
- Specially coated and ground for high repeatability of the movements
- Results in the lowest moving masses
- Enables high travel speeds with low drive power
- Guideways on air bearings for the realization of economical solutions with outstanding operating characteristics

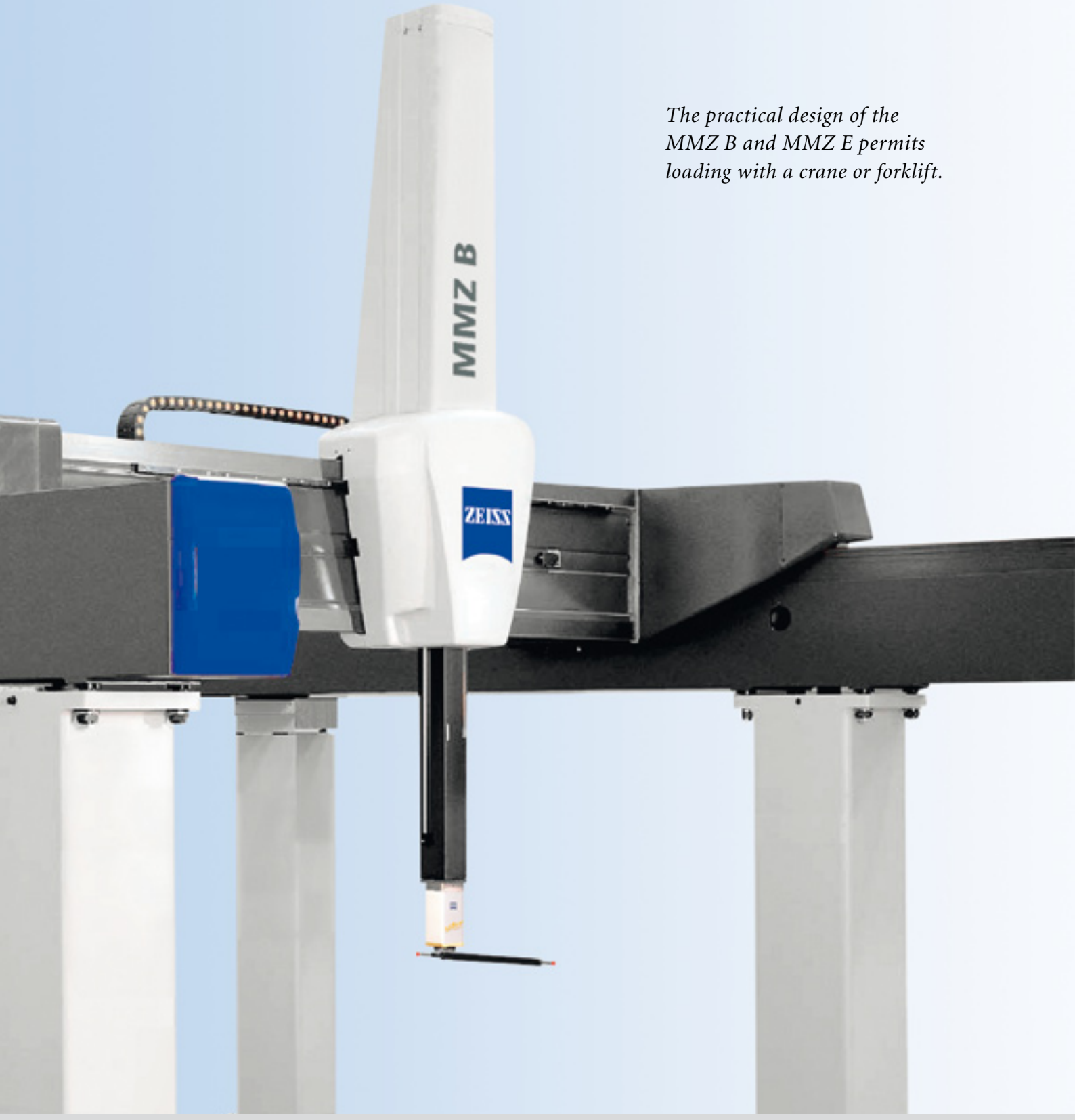
Temperature resistant machine geometry

- Measuring systems of the X and Y axes systematically arranged in one plane to minimize the influence of spatial temperature differences

Sensors

- RDS with TP6, TP20 and TP200 for single-point probing; VAST XXT measuring stylus for scanning or single-point probing
- WBScan optical line scanner for surface measurement
- Only on MMZ B: VAST gold for scanning or single-point probing

MMZ



The practical design of the MMZ B and MMZ E permits loading with a crane or forklift.

Dimensions

	Measuring range X x Y x Z [mm]	Linear measuring tolerance [µm]	L = measuring length in mm
MMZ B 2000	2000 x 3000 – 5000 x 1500 (2000)	**RDS/TP6**	6.0+L/166 (Z=1500); 8.0+L/125 (Z=2000)
		VAST gold	4.0+L/200 (Z=1500); 6.0+L/150 (Z=2000)
MMZ B 2500	2500 x 3000 – 6000 x 1500 (2000)	**RDS/TP6**	6.0+L/143 (Z=1500); 8.0+L/111 (Z=2000)
		VAST gold	4.0+L/180 (Z=1500); 6.0+L/130 (Z=2000)
MMZ E 2000	2000 x 3000 – 5000 x 1000 (1500)	**RDS/TP6**	6.0+L/167 (Z=1000); 8.0+L/125 (Z=1500)
MMZ E 2500	2500 x 3000 – 5000 x 1000 (1500)	**RDS/TP6**	9.0+L/110 (Z=1000); 10.0+L/100 (Z=1500)

The sensor system of these measuring machines corresponds to the range of sensors of the MMZ G and MMZ T (pages 28/29).

RST-P, DT, VAST® XXT, VAST XT gold, VAST gold

Noticeably exact

Carl Zeiss offers a variety of contact sensors, such as the RST-P and DT sensors for single-point measurement as well as the third generation scanning with the active VAST sensors from Carl Zeiss. They allow you to quickly, precisely and reproducibly inspect form elements such as roundness or straightness in a single measuring run.

RST-P

- Trigger sensor for fast, dynamic capture of measuring values through single-point probing
- Ideal for the automotive, engineering, tool making and mold making industries

DT DynaTouch

- Very robust, integrated dynamic system delivers high reproducibility with single point measuring
- DT has a self-centering feature and permits complex stylus configurations as a result of its automatic weight balancing
- Different styli can be used in one configuration

VAST XXT

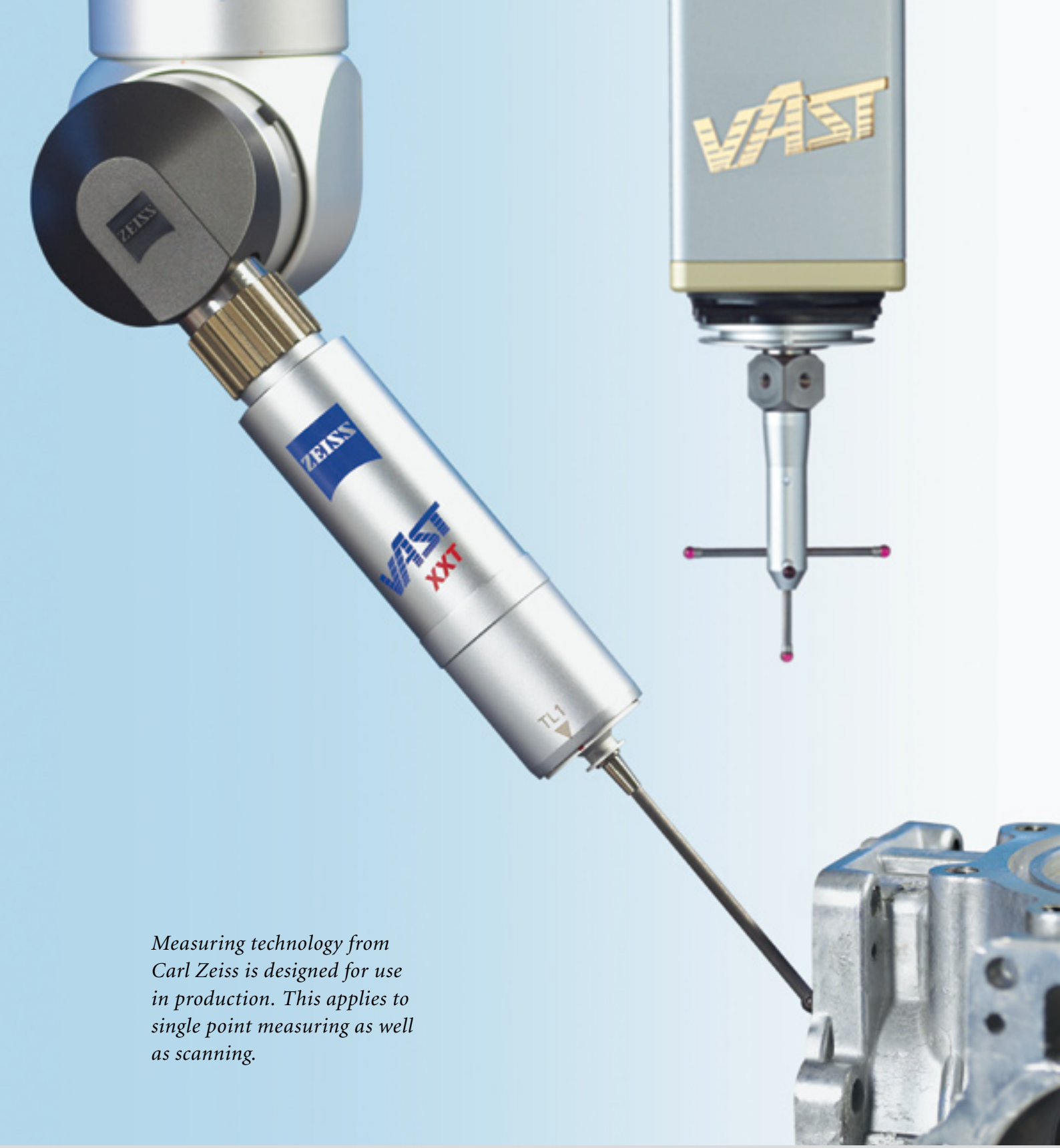
- Passive sensor as a replacement for trigger sensors
- Increases operational safety and the accuracy of the measurements
- For light, short and symmetrical stylus configurations, e.g. star probe
- For the measurement of parts that require many angular positions of the stylus

VAST XT gold, VAST XT

- Active scanning technology from Carl Zeiss
- High-speed scanning for each measuring task
- Complex and heavy styli combinations without a loss of accuracy; for stylus lengths up to 500 mm and stylus weights up to 500 g
- For form and position measurements, curve and freeform measurements, and reverse engineering
- Can be combined with navigator technology

VAST gold

- Active scanning probe for contact scanning and single-point measurements
- Collision protection in all directions
- Higher dynamic through optimized moving masses
- Higher rigidity through optimized joints
- Scanning speeds up to 300 millimeters/second
- Easy use of stylus lengths up to 800 mm, stylus weights up to 600 g and asymmetrical stylus configurations
- VAST gold – primarily with Navigator technology – drastically increases the measuring performance and thus productivity



Measuring technology from Carl Zeiss is designed for use in production. This applies to single point measuring as well as scanning.

ViSCAN, DTS, LineScan, EagleEye navigator.

The ViSCAN, DTS, LineScan and EagleEye navigator optical sensors are capable of delivering precise measuring results for sensitive, soft, finely structured or 2D test pieces.

ViSCAN

- Optical 2D image sensor
- Measurements in all spatial directions; rechucking the workpiece is unnecessary
- Different lenses can be used, making it possible to capture deep-laying features
- Parts with very small or 2D geometries and/or soft materials can be measured in the image with the auto focus system as well as perpendicular to the camera plane
- Difficult measurements can be performed on low-contrast test pieces such as punched components or printed circuit boards using the optional, mobile transmitted light stages.

DTS

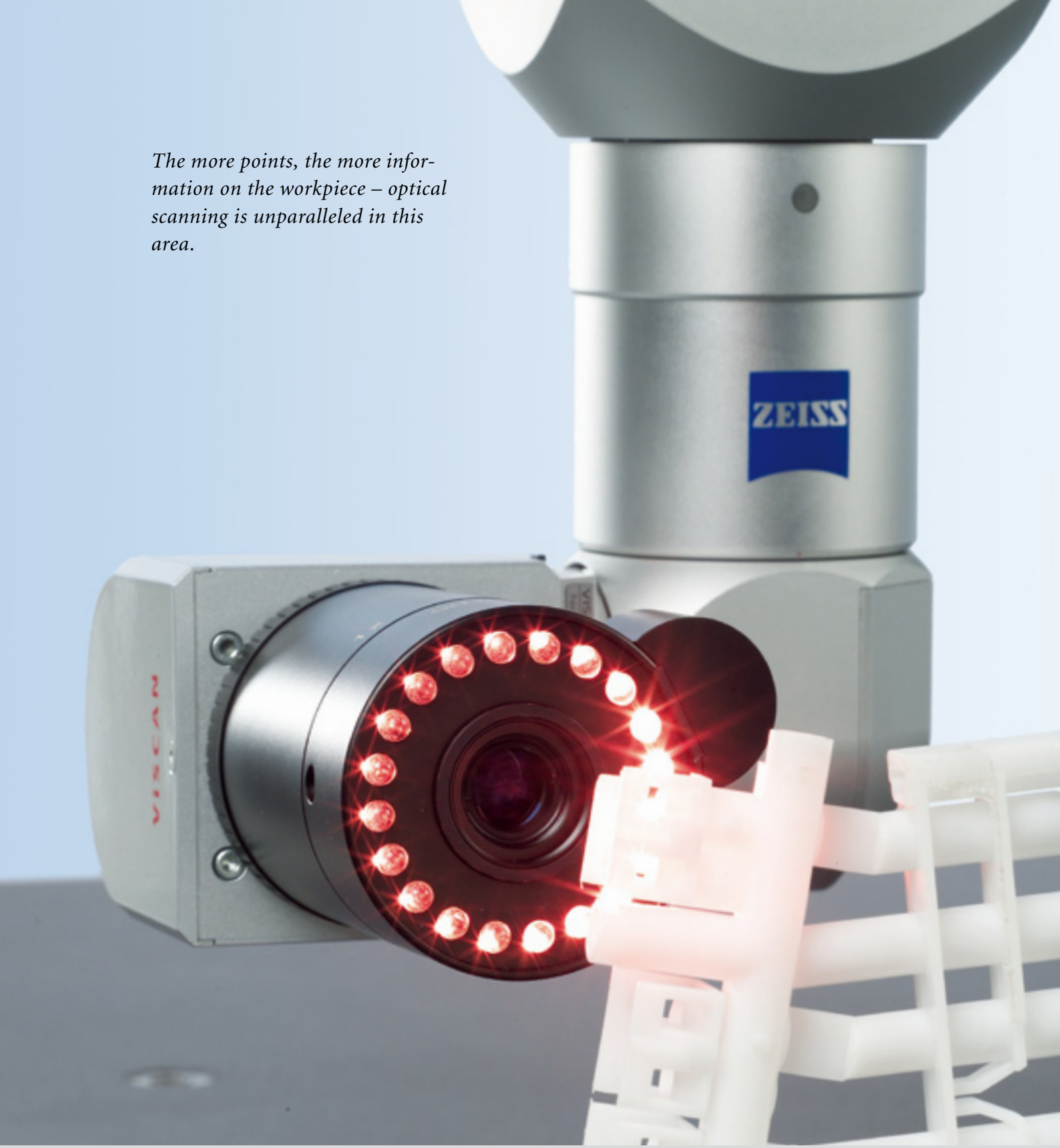
- Optical diode stylus for single-point measuring
- Clamping of materials is unnecessary; deformations avoided
- Simple, fast and reliable probing
- Compact design, low weight, no mechanical wear parts
- For soft and sensitive materials such as plasticine, clay, wood, plastics, foam parts, material or lacquered surfaces

LineScan

- Optical sensor to capture the entire surface of forms using point clouds for a comparison with available nominal CAD data sets or for the creation of a new CAD model or milling data
- Complete with scanner, software, cables
- Ultra-fast line scanner for high-speed digitization; captures 250,000 points per second; short measuring times enable considerable increases in productivity
- For contact-sensitive or finely structured surfaces in the areas of car body, mold/tool making, model making and design

EagleEye navigator

- Optical scanning for car body measurement based on laser triangulation
- Reduced measuring and reaction times, increased quality of the pressed parts
- Top-quality evaluations of the results with information on the diameter, position and form of the part feature down to the micrometer



The more points, the more information on the workpiece – optical scanning is unparalleled in this area.

Calypso and HOLOS NT.

CALYPSO enables you to complete all measuring tasks with one software at the click of a mouse – whether single-point or scanning, manual or CNC, on a coordinate measuring machine or offline. CALYPSO can be used for a variety of tasks.

Concept

- Software for all measuring strategies and tasks
- Integrated in production
- Can be combined with non-ZEISS measuring systems via DME interface
- Articulated-arm measuring machines, laser trackers and computed tomographs can be used
- Interfaces for all standard CAD formats

Programming

- Offers all design features for intuitive measurement program generation
- Fast and reliable programming through Visual Metrology™: tolerances are selected based on the requirements from the drawing or the CAD model; integrated assistant provides support during the selection of the references and creates the finished measurement plan

Measurement and evaluation

- Interactive guidance through CALYPSO during the measurement
- Filter function, special calibration procedures, optimum approach and travel paths, as well as measuring in one pass with VAST® navigator for highly precise measuring results
- Standardized protocol output in QDSA or DMIS
- Results can be transferred to SPC software

For standard geometries or freeform surfaces, HOLOS NT is the program of choice. This software features a modular design that can be adapted to your needs.

Programming

- Generate measurement programs by clicking on measurement and reference points on the displayed component
- Measurement of standard geometries and freeform surfaces in one process following upgrade

Modules

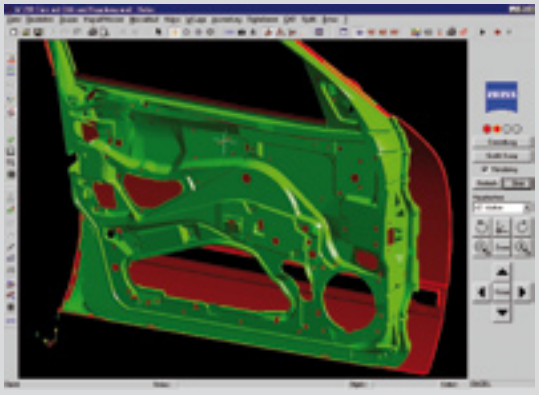
HOLOS Geo
- Measurement of standard geometric features
- Automatic user guidance

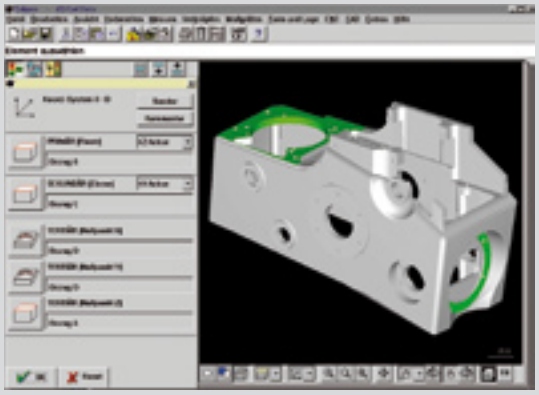
HOLOS Light
- Measurement of curved surfaces with a plan/actual comparison
- Complete graphic display of the measurement for reliable interpretation of the measured values

HOLOS Extended
- Quickly and very accurately measure complex freeform surfaces
- Complete automation of measurement runs
- Open data exchange
- Ideal for comparing models in a single step during cubing

HOLOS Digitize
- Digitization of curves and surfaces
- Direct conversion into CAD data for immediate checks
- Automatic calculation of defined scanning lines

While CALYPSO is ideal for a variety of different requirements, HOLOS NT has been specially designed to measure standard geometries and freeform surfaces.





Contourecord and Surfcom.

With the Surfcom and Contourecord lines, Carl Zeiss meets the demands of surface and contour measurement. They are based on a modular machine design, enabling Carl Zeiss to always offer the ideal solution.

Systems

- Surfcom 1500: The comfortable measuring station for surface measurements
- Contourecord 1700/2700: The flexible measuring station for contour measurements
- Contourecord 1900/2900: The flexible measuring station for surface and contour measurements
- Surfcom 2000: The system for surface and contour measurements in one pass
- Surfcom 5000: Contour and surface technology for the highest demands

Software

TIMS – integrated software for form, contour and surface

- Facilitates the exchange of measurement data, e.g. from form or roughness analyses directly to contour analysis, in order to permit the evaluation of micro-contours according to specific requirements, for example
- Typical features of contour analyses such as the calculation of radii, angles and gaps can be quickly and easily evaluated

Options

- Modular system with various CNC table modules
- Combination of table modules: motorization of each axis to align and position the workpiece
- Programming of fully automatic CNC measuring runs via the TIMS software platform

Contourecord

Surfcom

Contourecord and Surfcom are the experts for surfaces and contours – in the workshop, in production or in the measuring lab.

Rondcom.

Workpieces in peak condition

The precise determination of form parameters such as roundness, concentricity and cylindricity is an essential element of the quality assurance process. Even manual form testers provide very good accuracy while also measuring quickly. CNC programs are generated with graphic support and ensure time savings, load relief and measuring uncertainty.
The Rondcom line from Carl Zeiss provides operators with optimum support for the inspection of forms. The excellent value for the money is another optimum feature of this measuring machine.

Key features

The right system for every requirement

- Broad line of manual and CNC machines for form measurements on workpieces of varying size
- Manual or CNC capable rotary tables on air bearings with radial runout accuracies down to 0.02 µm on the reference point
- Rotary table and precise guideway axes ensure very high accuracy

Software

TIMS software strategy: flexible measurement and evaluation

- Easy-to-use with a control panel or graphic software support, as well as a Windows-based computer workstation
- Correction software with Rondcom 44/54 delivers high measuring accuracy beginning with the rough alignment
- Exchange data, for example between form and roughness analyses for a contour analysis

Options

- Fulfillment of various requirements through different sized columns and/or for increased load
- Rondcom 54, 55 and 60 can be equipped with a CNC stylus system for CNC volume measurements
- In TIMS, for example, enhancement modules for special analyses such as gear tooth tip and piston evaluations, statistics and Fourier analysis

When quality assurance demands precise form measurements, Rondcom is the right choice.

Services.

Comprehensive support

The quality for which Carl Zeiss stands, is reflected in its measuring machines, sensors and software products, as well as the company's services. Carl Zeiss offers everything associated with first-class service in all areas of industrial metrology.

Training

Training Centers
- Customized training courses, qualified instructors
- Training rooms with state-of-the-art machinery

Workshop: onsite training and support
- Customized training
- Current and upcoming measuring tasks are discussed with the instructor (support)
- Result: in-depth measuring expertise, optimum use of the coordinate measuring machine technology, avoidance of errors, increased efficiency of the systems

Measuring services

Contract measurement
- Completion of measuring tasks
- Our lab is accredited by the German Calibration Service (DKD) in accordance with DIN EN ISO/IEC 17025 for the measurement of prismatic workpieces

Contract programming and start-up support
- Generation of CNC programs based on drawings, CAD models, measurement plans or individual specifications

Machine service

Upkeep and maintenance
- Continual exchange of particularly stressed machine components
- Use-dependent modules are tailored precisely to customer needs

System Technology

Production integration
- Task-specific integration of metrology systems in production areas
- Measuring lab planning, clamping devices, measurement programs and feeding systems from one provider
- Expert project planning

Computer and network technology
- Ensures the seamless operation of all IT systems
- Provision of software solutions and software installations

Teleservice

- Specialists are directly available online for error diagnostics, software updates, user support and training

Modernization

- Modernization packages to retrofit measuring machines

Software forums

- To exchange information with other users of the ZEISS CMM Master Control Center, CALYPSO software and other software

Customized service packages from Carl Zeiss are focused on the current needs of the customer as well as the changed conditions of industrial production.

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