HEXAGON
METROLOGY

OPTIV

The multitalented system for industrial metrology

A NEW PERSPECTIVE.

The Optiv multi-sensor brand from Hexagon Metrology opens countless opportunities for you in the quality assurance of precision components. The measuring machines combine a great deal into one system: optical and tactile measurement procedures, flexibility and accuracies from a few microns down to the submicron range.

The advantages of multi-sensor technology are plain to see: optical and tactile sensors can be called upon during the same measuring routine. Parts need to be re-clamped less frequently and absolute references are not lost. Optiv is the choice when three-dimensional data with a high measuring point density is required.

A strong team of developers with links all over the world ensures the continuous development of the Optiv measuring system. Our centre of excellence in Saarwellingen, Germany integrates development and production. And of course it is ISO 9001 certified.

Our commitment to you begins with the delivery of the system: Hexagon Metrology is represented worldwide with over 70 Precision Centres supplying full customer support and on-site service. We are here for you from A to Z with servicing, repair, upgrades, programming and training.
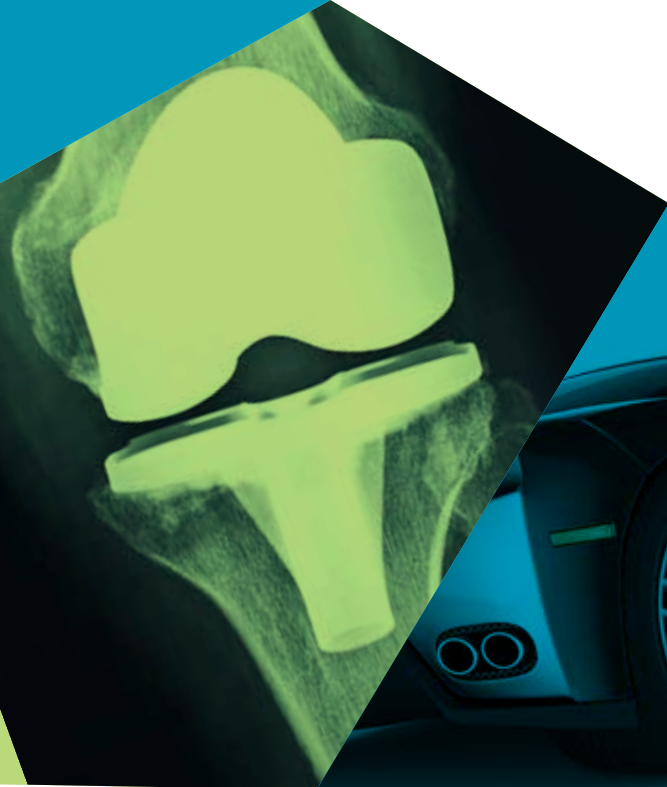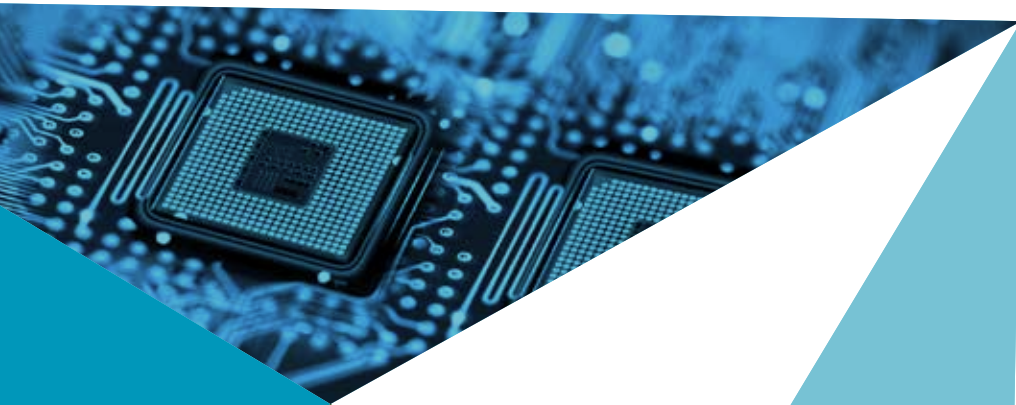
FROM THE SMALL TO THE UNTOUCHABLE.

Systems that combine optical and tactile measurement offer one thing above all: flexibility. Various sensor technologies and measurement strategies come into play, depending on the 3D geometry, material, reflection characteristics and accuracy requirements of the part to be inspected. Optiv has the solution for your application – no matter how complex.

Flat parts
Stampings, gaskets, circuit boards, patterns, films, foils, gauges and glass masks. These parts are made typically from thin materials. They deform easily, have delicate surfaces and the smallest features or finest surface structures. The optimum measurement strategy: quick, non-contact measurement using very high precision with the Vision-Sensor and the Chromatic White Light Sensor (CWS).

Die-cast and injection-moulded parts
These manufacturing techniques are capable of producing very complex 3D components in miniature detail. Using optical and tactile sensors accelerates and simplifies the inspection of these items. Components and tools can be fully measured from one clamping position using one programming routine. The measurement time is reduced – a great opportunity for pallet inspection.

2D and 3D precision parts
Precision nozzles, watch and clock components, gears, keys, tools, dies, pistons, valves and implants. These parts are normally very small and call for very tight tolerances. This can be solved by using a high resolution Vision-Sensor with a digital CCD camera, variable and high contrast illumination with powerful image processing.
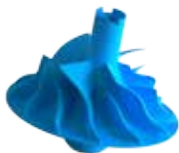
Rotationally symmetrical parts
Drilling tools, injection nozzles, bushes, gears and other parts with features distributed around the workpiece. CNC-controlled rotary tables and Dual Rotary tables allow access to the otherwise hidden parts.

Contours
Measurement points are captured by scanning the shape using the Vision-Sensor, tactile sensors, the TTL-Laser or CWS. The point density can be modified to suit the particular application. PC-DMIS Vision CAD is comparing the actual dimensions with the specified contours during the measurement process.

Free-form surfaces
Free-form surfaces are inspected by comparison with a CAD model. With the help of the innovative CWS, TTL-Laser or tactile sensors, the surfaces of the parts can be digitised by surface scanning. The resulting surface data is suitable for direct comparison with the CAD model; this can also be of use in surface reconstruction for reverse engineering.

A SPECIAL BASIS.

Optiv measuring systems are built to ensure that high-precision measurement results are quickly available. With Optiv you can count on top precision.

Features	Benefits
Exclusive Dual Z-Design with two vertical axes	Optical and tactile sensors are assigned to two independent vertical axes. When measuring complex 3D workpieces the positioning of the sensors is easier. Makes it possible to use motorised indexing probe heads.
High-precision air bearing technology	All axes are equipped with pre-loaded air bearings and precision-lapped granite guides in order to achieve maximum positioning and measuring accuracy. The movable measuring table is stabilised horizontally and vertically using a dovetail guideway.
Rotary tables and Dual Rotary tables	Makes it possible to rotate items in the workpiece coordinate system in one or two axes. That means that sensors can reach concealed characteristics without re-clamping.
Dual Camera optics	Two camera systems are installed in an optical path and display two image sizes. The image sizes are selected electronically, i.e. no accuracy is lost through mechanical movements. Zoom steps can be switched within milliseconds.
Granite base	The fine-pored, hard natural stone, which does not change in form when exposed to temperature changes, is the base material used for all Optiv measuring machine stands – and ensures perfect accuracy over the long term and good vibration stability, and makes it possible to measure workpieces with a large mass.
Machine enclosures	Temperature-controlled machine enclosures with integrated damping systems are suitable for use on the production floor. They provide excellent protection against adverse environmental influences, such as temperature fluctuations, dirt and floor-borne vibrations.
Flexible clamping devices	For secure and simple clamping of the inspected items.

Exclusive Dual Z-Design
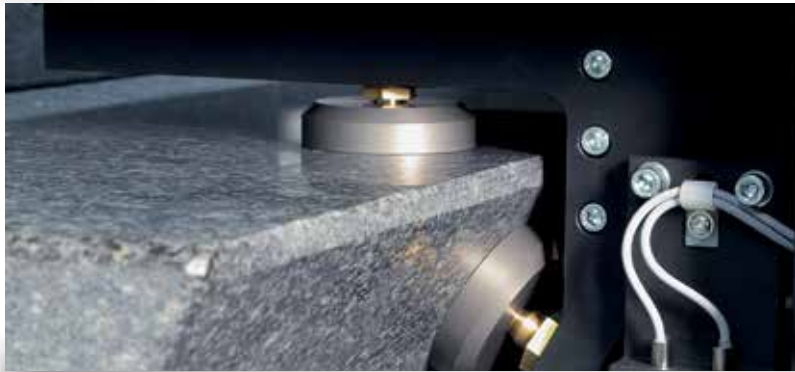
High-precision air bearing technology
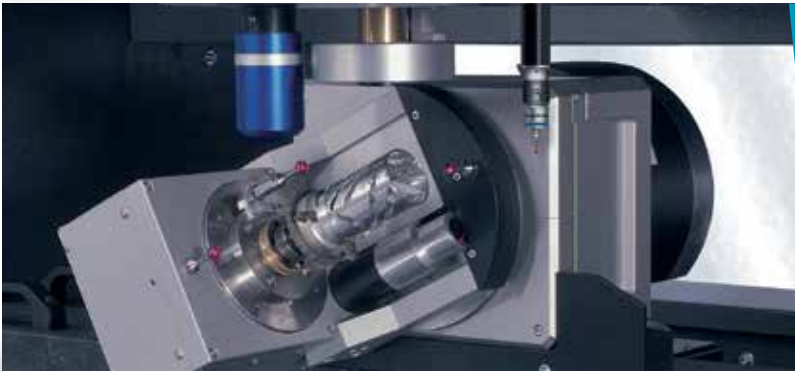
Rotary tables and Dual Rotary tables

Dual Camera optics

Granite base

TACTILE OR OPTICAL? MULTI-SENSORY!

Optiv measuring machines support inspection with the Vision-Sensor, Chromatic White Light Sensor (CWS), Through-The-Lens-Laser (TTL-Laser) and tactile probes.

Vision-Sensor
The high-resolution Vision-Sensor performs non-contact measurements of the smallest items subject to the tightest tolerances as well as features that would be deformed if probed with tactile sensors.
- High-resolution CCD camera, black/white or colour, analogue or digital
- Equipped with CNC zoom, fixed optics or Dual Camera optics
- Variable, high-contrast illumination with incident light, transmitted light and multiple segment ring light

Leitz scanning probe head LSP-X1
The LSP-X1 probe head provides measuring methods such as point-to-point probing and continuous High-Speed-Scanning in open- and closed-loop-scanning-mode. Thus, fast and very precise form and contour measurements are possible also in combination with star styli – with or without CAD-support.

Chromatic White Light Sensor (CWS)
The CWS is a scanning measuring sensor with an extremely high resolution, which can even cope with glossy, transparent or porous surfaces. It is also suitable for the topographical acquisition of microstructures.
- Measuring range from 300 µm to 10 mm
- Working distance from 4.5 mm to 75 mm
- Resolution up to 10 nm

Through-The-Lens-Laser (TTL-Laser)
By coaxially projecting the laser light into the optics, the laser is focussed in the centre of the field of view of the Vision-Sensor. Measuring by laser and video at the same time in one measurement routine accelerates measuring speed. The TTL-Laser is suitable for simple scanning tasks.
- Resolution ± 0.1 µm
- Focusing speed 0.2 s
- Contour and surface scanning at 350 measured points per second

Tactile Sensors
Contact sensors complete the multi-sensor package. Ideal for measuring 3D elements such as spheres, cones and cylinders and features that cannot be seen in plan view.
- Motorised indexing probe heads
- Probe changer with up to 6 module positions
- Stylus modules with different trigger forces

UNIQUE PERSPECTIVES WITH PC-DMIS VISION.

PC-DMIS Vision has some unique features up its sleeve that allow you to achieve your measuring and programming goals more quickly. You can save up to 75% of your programming time. It could not be simpler to create measuring programs. These are some of the highlights of the extensive range of features of PC-DMIS Vision:

CAD integration for 2D and 3D measuring
PC-DMIS Vision facilitates a seamless integration of 3D CAD data in any format, for example in IGES, STEP, DMIS and many others. With the help of Direct CAD Translators (DCTs) or Direct CAD Interfaces (DCIs) the software can also be used with proprietary CAD systems such as CATIA, Unigraphics and Solid Works. The CAD model serves as master part from which you can simply select elements and inspection characteristics. The software compares the measurement data with the nominal CAD data in real time. Because the software works with genuine 3D models, you can measure 3D characteristics with your Vision system.
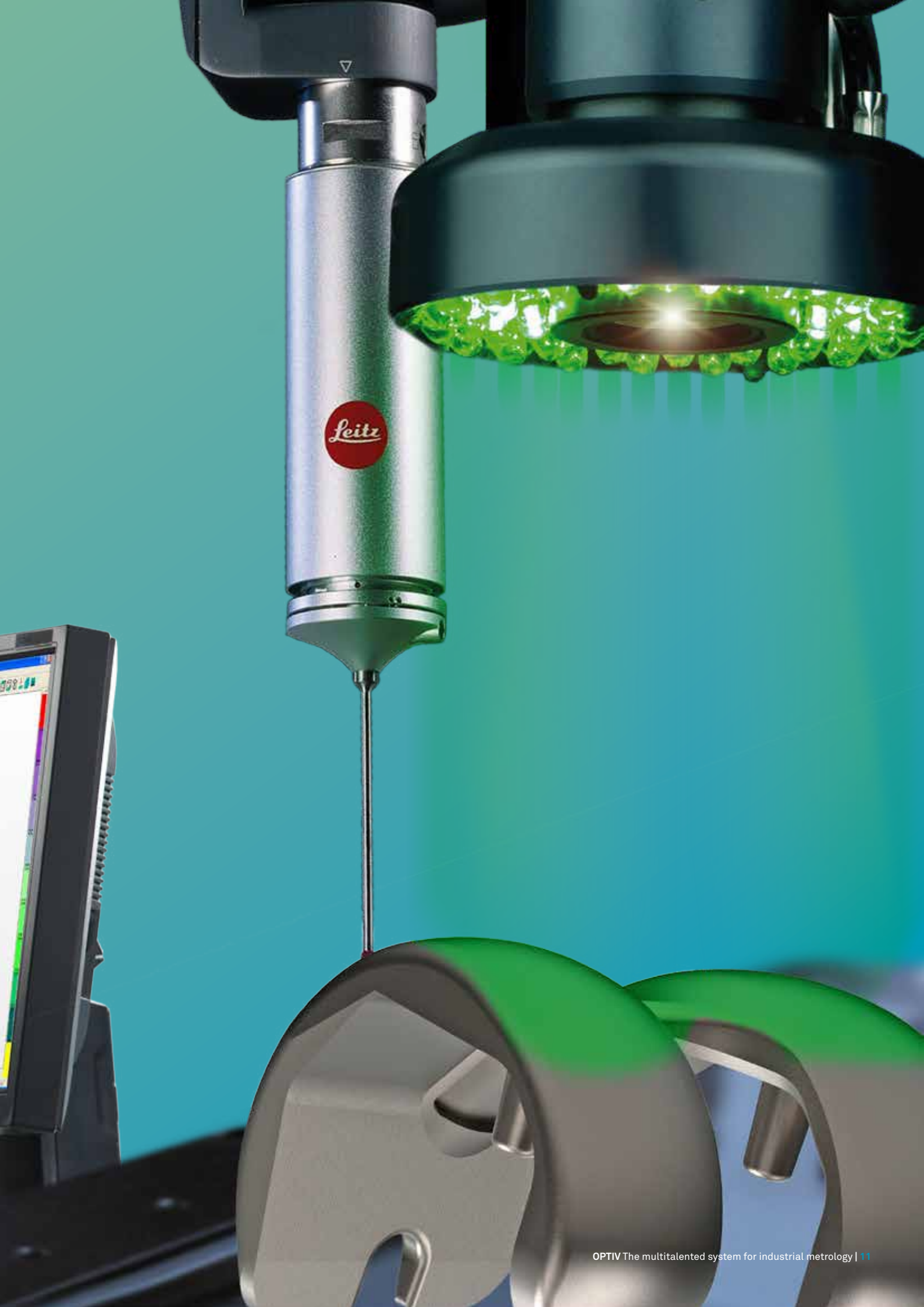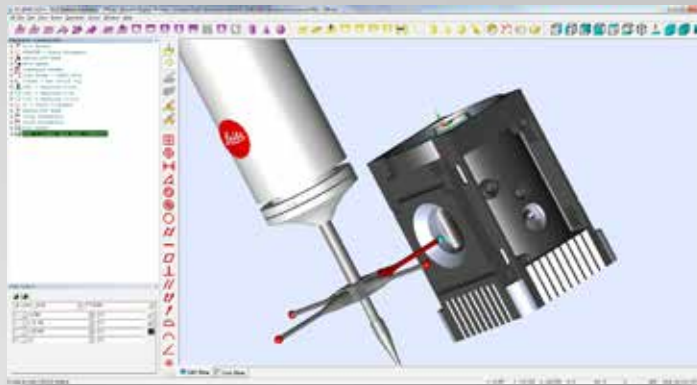
DataPage+ meets the requirements of FDA CFR Part 11.

Offline programming with PC-DMIS Vision.

Offline programming

With PC-DMIS Vision you can use CAD models to do programming offline. Your measuring machine remains available for measuring tasks. Collision checks and sensor path optimisations are carried out with 3D simulations. The simulations also take into account critical parameters of optical measurement, such as illumination, focusing and magnification.

High-Speed-Scanning

PC-DMIS Vision supports multi-sensor configurations including cameras, tactile sensors, lasers and white light sensors. The LSP-X1 probe head provides measuring methods such as point-to-point probing and continuous High-Speed-Scanning in open- and closed-loop-scanning-mode. Thus, fast and very precise form and contour measurements are possible – with or without CAD-support.

MultiCapture

In only one shot MultiCapture measures all the elements in the image field of the camera. The simultaneous acquisition and measurement of different features tightly packed together accelerates the inspection process by 35 to 70% – depending on the size of the features and how densely they are arranged.

MultiSelect

You would like to select several features on the CAD model with just one click? MultiSelect allows you to select several elements at the same time using the cursor. PC-DMIS Vision transfers all the selected features into the measuring program. You no longer have to program the features one by one.

DataPage+

DataPage+ now also meets the requirements of FDA CFR Part 11. Some of the most important characteristics are:
- Reporting to ensure traceability
- AutoLock system
- User account control
- Password obligation for users
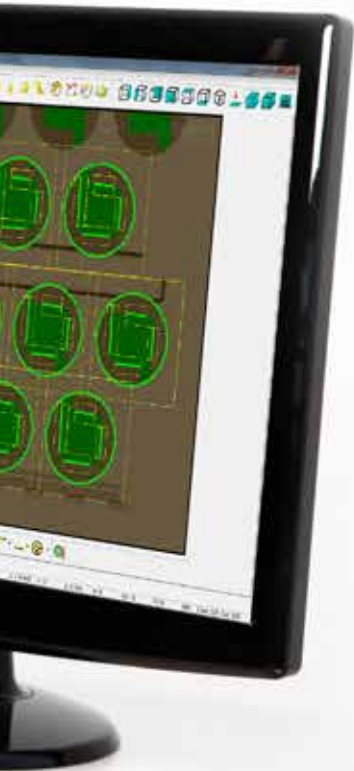
MultiCapture measures several elements at the same time.

THREE SERIES.
MANY POSSIBILITIES.

Dual Z-Design

The Optiv range consists of three series, each with a different accuracy, construction, and range of available sensors and accessories. Starting with the Optiv Classic for an economic entry into multi-sensor measuring technology right up to the top Optiv Reference series for satisfying the highest demands. The Dual Z-Design is available as an exclusive option.
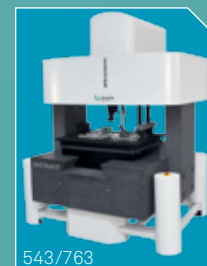
OPTIV

CLASSIC

- Cost-efficient 3D entry-level machines
- Vision-Sensor and touch trigger probes

PERFORMANCE

- 3D precision measuring machines with mechanical bearings
- Full multi-sensor capability, Optiv Performance 443 optional with Dual Z-Design
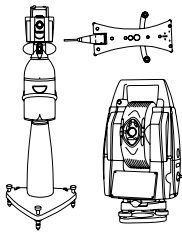- Acceptance test according to ISO 10360-7 and ISO 10360-2

REFERENCE

- Ultra-precise 3D measuring machines with air bearings
- Full multi-sensor capability, all models are optionally available with Dual Z-Design
- Acceptance test according to ISO 10360-7 and ISO 10360-2

321 GL

222

543/763

322/432

443

10103

443

664

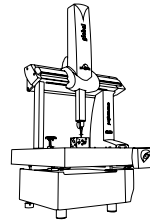| Model	Construction									Sensors									Accessories			
	Measuring range in mm			Dual Z-Design	Table load in kg	Design		Axes		Vision-Sensor			TTL-Laser	CWS	Tactile Sensors				Machine enclosure	Rotary table	Dual Rotary table	Vibration damper
	X	Y	Z			XY cross-table	Fixed bridge, moving table	Mechanical bearings	Air bearings	CNC zoom	Fixed optics	Dual Camera			Touch-trigger probe	Scanning probe LSP-X1	Probe changer	Motorised indexing probe head (only for Dual Z)				
Optiv Classic *(Accuracy range: 3µ 2µ 1µ 0.5µ)*																						
321 GL	300	200	150		20	✓		✓		✓					O		O			O		
322	300	200	200		16	✓		✓		✓					O		O			O		
432	400	300	200		16	✓		✓		✓					O		O			O		
443	400	400	300		30		✓	✓		✓					O		O			O		
Optiv Performance *(Accuracy range: 3µ 2µ 1µ 0.5µ)*																						
222	250	200	200		10	✓		✓		✓	O	O	O	O	O	O	O		O	O		O
443	400	400	300	O	30		✓	✓		✓	O	O	O	O	O	O	O	O				O
664	600	600	400		40		✓	✓		✓	O	O	O	O	O	O	O		O	O	O	O
Optiv Reference *(Accuracy range: 3µ 2µ 1µ 0.5µ)*																						
543	530	400	300	O	150		✓		✓	O	O	✓	O	O	O	O	O	O		O	O	O
763	730	600	300	O	150		✓		✓	O	O	✓	O	O	O	O	O	O		O	O	O
10103	930	1000	300	O	150		✓		✓	O	O	✓	O	O	O	O	O	O		O	O	O

Legend
✓ Standard
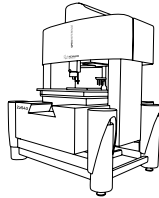O Option

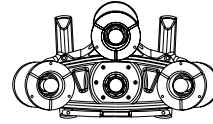LASER TRACKERS
& STATIONS

PORTABLE MEASURING ARMS

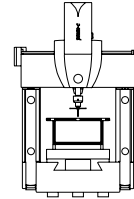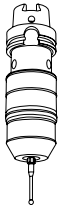BRIDGE CMMS
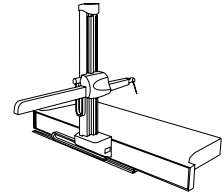
HORIZONTAL ARM CMMS
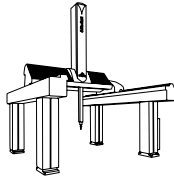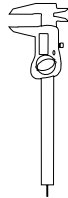
GANTRY CMMS

MULTISENSOR & OPTICAL SYSTEMS
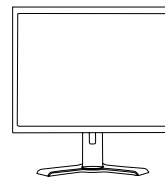
WHITE LIGHT SCANNERS

ULTRA HIGH ACCURACY CMMS

SENSORS

PRECISION MEASURING
INSTRUMENTS

SOFTWARE SOLUTIONS

HEXAGON
METROLOGY

Hexagon Metrology offers a comprehensive range of products and services for all industrial metrology applications in sectors such as automotive, aerospace, energy and medical. We support our customers with actionable measurement information along the complete life cycle of a product – from development and design to production, assembly and final inspection.

With more than 20 production facilities and 70 Precision Centers for service and demonstrations, and a network of over 100 distribution partners on five continents, we empower our customers to fully control their manufacturing processes, enhancing the quality of products and increasing efficiency in manufacturing plants around the world.

For more information, visit **www.hexagonmetrology.com**

Hexagon Metrology is part of Hexagon (Nordic exchange: HEXA B). Hexagon is a leading global provider of design, measurement and visualisation technologies that enable customers to design, measure and position objects, and process and present data.

Learn more at **www.hexagon.com**