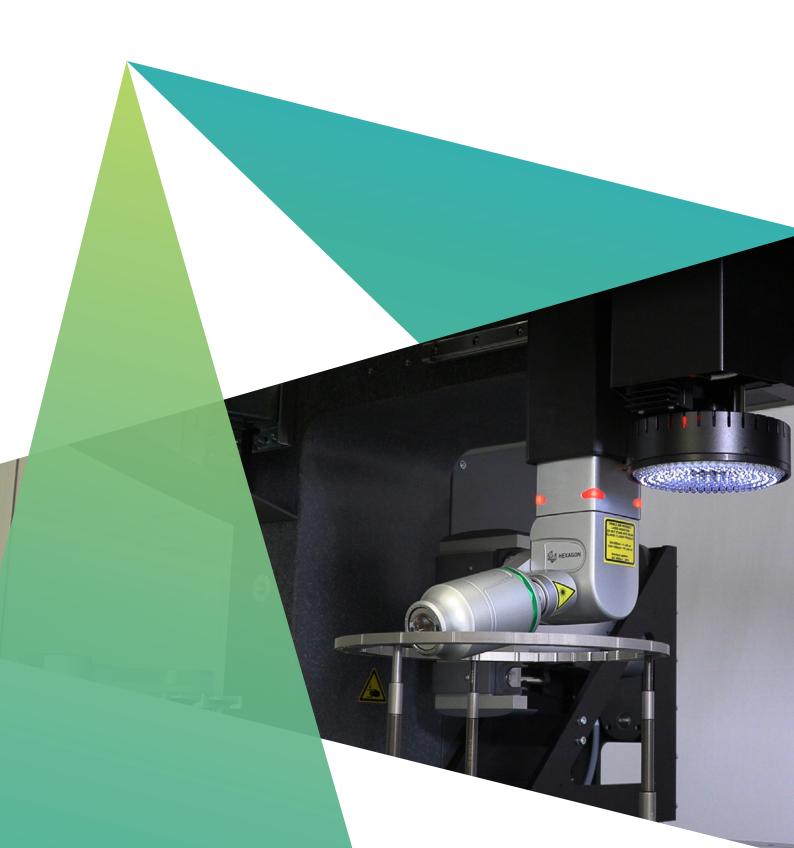
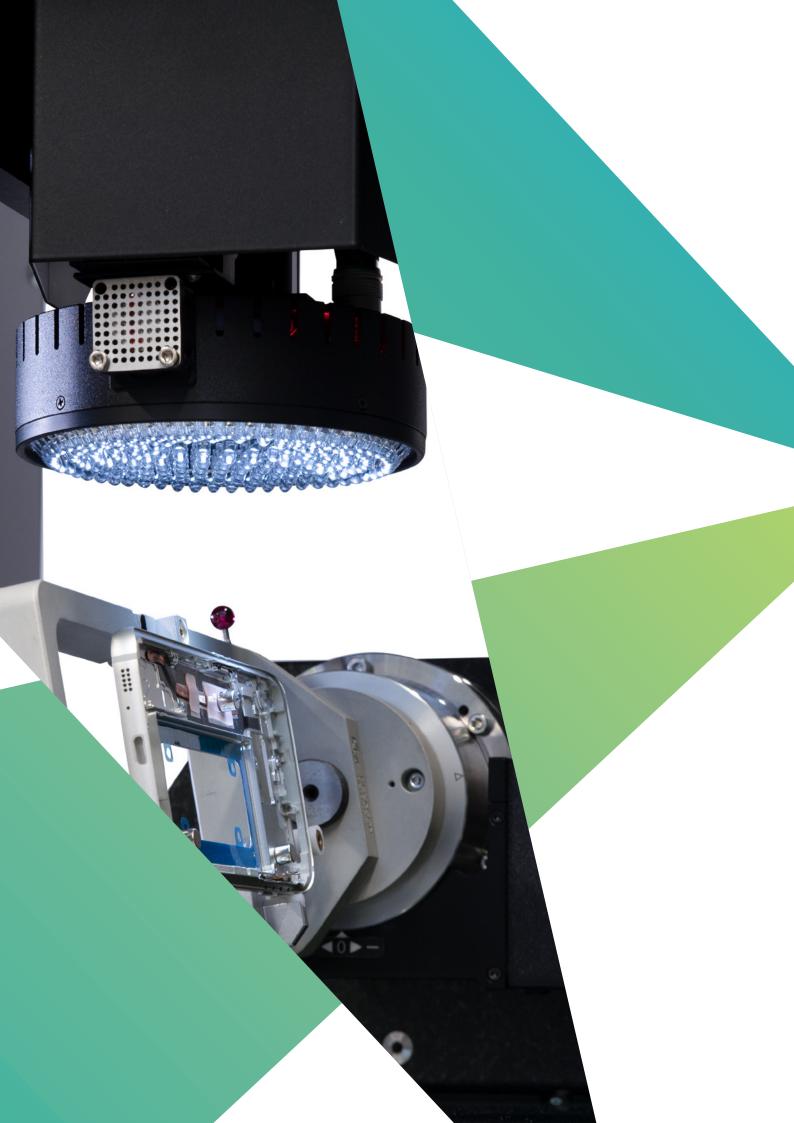


OPTIV M multisensor CMMs

3D multisensor versatility optimised for individual applications





Discover multisensor measurement

Multisensor coordinate measuring machines bring the capabilities of different contact and non-contact sensor technologies together within a single machine.

A multisensor system measures the geometric characteristics of the most complex components more completely than is possible on any single-sensor measurement system. When many different parts need to be measured, manufacturers benefit from the availability of sensors ready for varying feature sizes, dimensional tolerances, surface finishes and accuracy requirements.

The best suited sensor for the measurement task at hand is automatically deployed in an automated measurement routine setup for the specific part to be measured, resulting in highly efficient measurement cycles and subsequently improved manufacturing productivity – the fundamental benefits of multisensor metrology systems.

The benefits of multisensor systems

Application flexibility and measurement cycle efficiency

Do more in less time with lower cost

- Cut capital and operating expenses by integrating the functions of multiple specialised measuring systems into one machine.
- Fixture the part once and get all measurements from an automatic measurement cycle with no operator intervention.
- Increase accuracy by applying the most appropriate sensor technology for the part feature to be measured.
- Gain operational simplicity with PC-DMIS metrology software that tightly integrates all the sensors and consolidates the data into a single measurement report.

The OPTIV M range

Flexible multisensor configurations on a modular and future-ready metrology platform

The OPTIV M range offers targeted metrology solutions with its Vision+, Scan+, DualScan+ and DualScan i+ models plus additional enhancement options.

Each of the four OPTIV M models bundles targeted 3D multisensor measurement capabilities to form a holistic application solution to the specific requirements of a particular application class.

Whether tailored and perfected for simple dimensional inspection or for the most comprehensive GD&T analysis of complex parts, OPTIV M always solves the measurement tasks at hand completely.

With OPTIV M, manufacturers from all industries easily find the most productive solution for their individual measurement challenges.





The OPTIV M offers precision, reliability and speed for the measurement of our bottles and capsules"

Eric Debreuille.

Packaging Optimisation & Line Efficiency (POLE) manager, L'Oréal

The identity of OPTIV M 3D multisensor CMMs

Building on a solid foundation of advanced design principles

Every OPTIV M machine is built on a common platform of modern measurement technology, which is then enhanced with additional systems designed to meet the needs of specific applications.

True 3D measurement performance

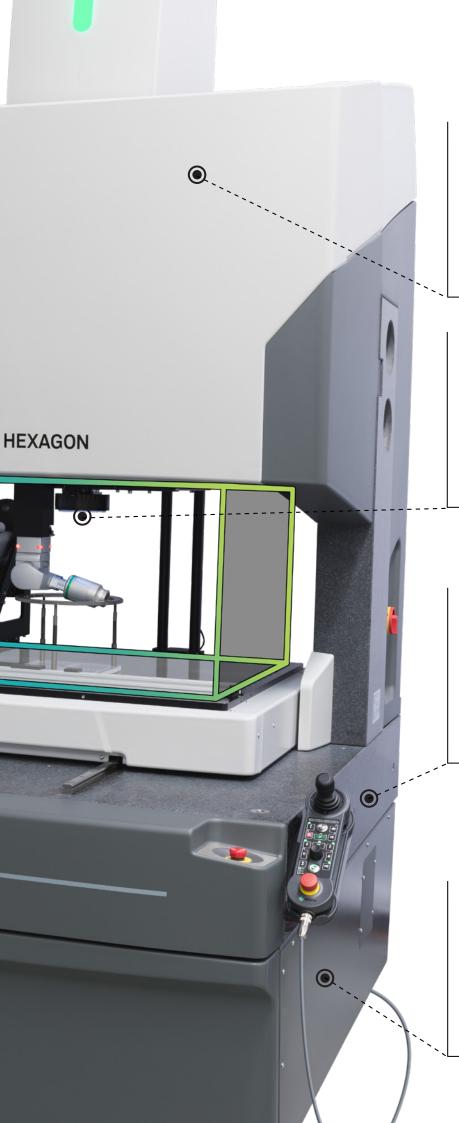
ISO 10360 standard-compliant 3D accuracy – anywhere in the measurement volume.

Future-ready metrology platform

Scalable CMM capabilities with field-installable upgrade kits.

Passive vibration dampers

Compensation for external floor vibrations enables the use of the CMM close to tough industrial environments.



Parametric temperature compensation

Real-time compensation of thermally caused measurement deviations – through temperature sensing at multiple locations within the machine and on the workpiece – ensures reliable measurement results in less temperature-controlled environments.

Vision sensor

High-resolution camera sensor for fast non-contact measurement of very small geometric features or deformable parts.

Torsion-resistant and low-vibration granite construction

Static and dynamic stiffness allow for exemplary 3D accuracy at both high speeds and under acceleration.

Full integration with Hexagon's Smart Factory ecosystem

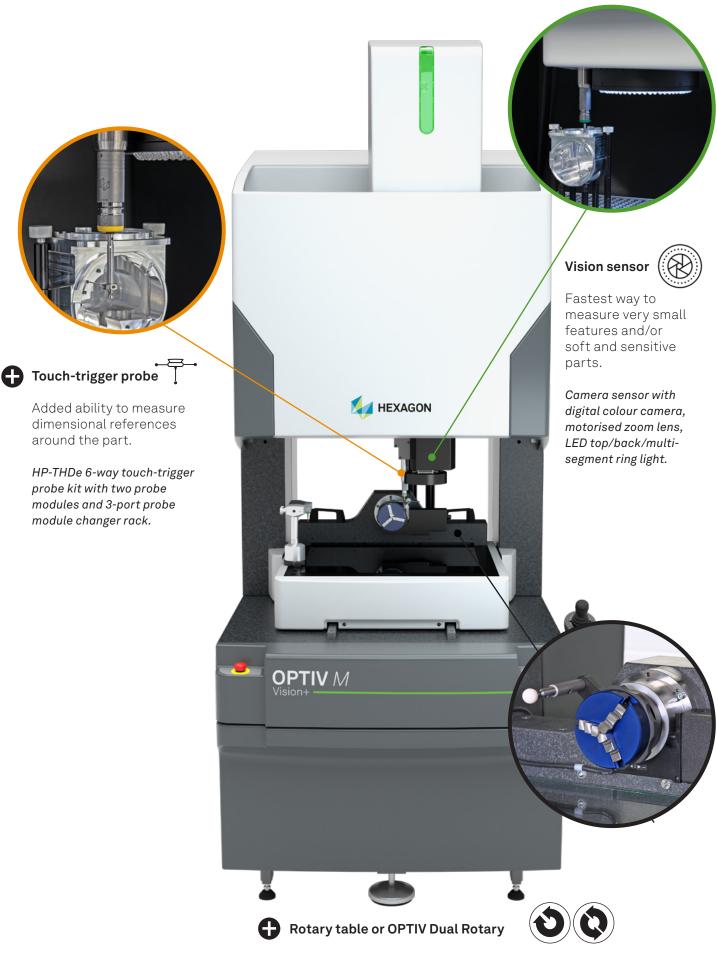
Seamless connectivity with automated smart production environments.



OPTIV M Vision+

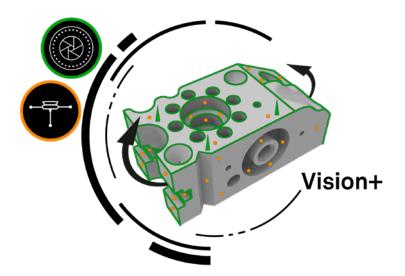
The performance standard for general-purpose 3D multisensor measurements

OPTIV M Vision+ provides an all-in-one solution for the multisensor measurement of geometric size features on precision parts of any material and surface finish.



Added ability to measure parts in multiple views without re-clamping.

CNC rotary table for OPTIV M 4.4.3 and 6.6.4 Vision+. CNC stacked rotary tables (OPTIV Dual Rotary) for OPTIV M 6.6.4 Vision+.



Edge detection
Lateral contour scanning
Video autofocus

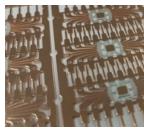
+ Single point probing

Target application class

Geometric size, position, orientation

Typical part and feature characteristics	 Any material – rigid/deformable, multi-colour, opaque/transparent/reflective Microscopic features 3D elements and dimensional references distributed around the part 	
Application examples	Electric motor laminations Lead frames, electrical contact components, stamping grids Battery foils, membrane electrode assemblies (MEAs) for PEM fuel cells Rigid / flexible printed circuits (PCB / FPC)	 Stamped-bent parts Mating parts from assemblies Extruded profiles Photomasks from semiconductor engineering Gaskets











Key application

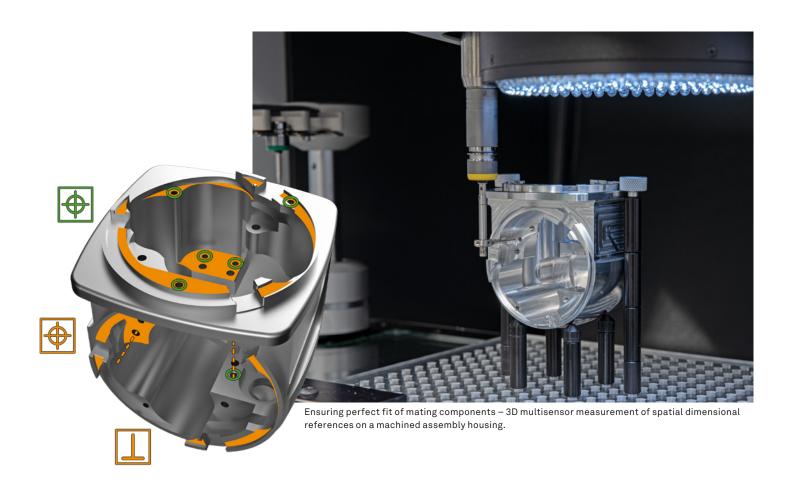
Assembly housing

With its genuine 3D multisensor capability, OPTIV M Vision+ is best suited not only for quickly measuring datum features but also for reliably check relative positions between complex 3D arrangements of features.

The high-resolution camera and fast video autofocus of the Vision sensor allows for quick non-contact measurement of lateral features at any height, providing full 3D position and size information (3D position of fitting holes).

Such dimensions are then related to each other and to additional features with arbitrary orientation (perpendicular holes, contact surfaces) or 3D dimensions (orientation of bore cylinder), which are measured with the HP-THDe 6-way touch-trigger probe using various stylus configurations.

As a result the perfect fit of mating components into the housing during the assembly process is assured.

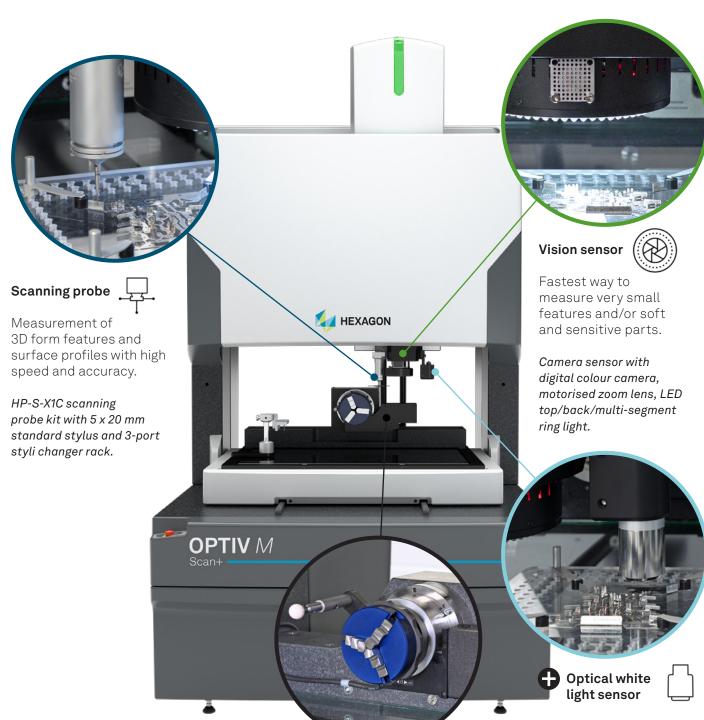




OPTIV M Scan+

The 3D multisensor scanning solution that extends the range of applications to high-resolution form measurements

OPTIV M Scan+ provides an all-in-one solution for the multisensor measurement of geometric size and form features, additionally enabling functional fit inspection of precision parts of any material and surface finish.



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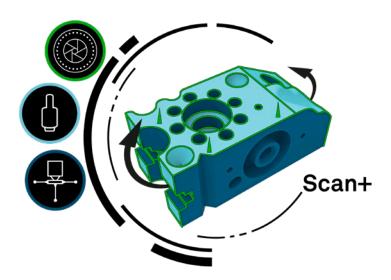
Rotary table or OPTIV Dual Rotary

Added ability to measure parts in multiple views without re-clamping.

CNC rotary table for OPTIV M 4.4.3 and 6.6.4 Scan+. CNC stacked rotary tables (OPTIV Dual Rotary) for OPTIV M 6.6.4 Scan+.

Added ability for surface-independent non-contact measurement of extremely small 3D structures and fast scanning of surface profiles.

OPTIV CWS kit with 1, 2 or 3 mm sensor head.



Edge detection Lateral contour scanning Video autofocus

- + Non-contact distance measurement
- + Non-contact scanning
- + Contact scanning

Target application class

Geometric size, position, orientation

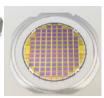
+ Geometric form

Typical part and feature characteristics	 Any material – rigid/deformable, multi-colour, opaque/transparent/r Microscopic features 3D elements and dimensional references Any surface finish – microstructure Functional surfaces and freeforms 3D microgeometries 	ences distributed around the part ed, coated
Application examples	 Dental implants Electrical plugs, connectors and connector assemblies Precision mouldings Cutting tools (indexable inserts) 	 Watch plates Medical needles, syringes and surgical instruments Wafer for microelectronics and photovoltaics Precision optics, lenses















Key application

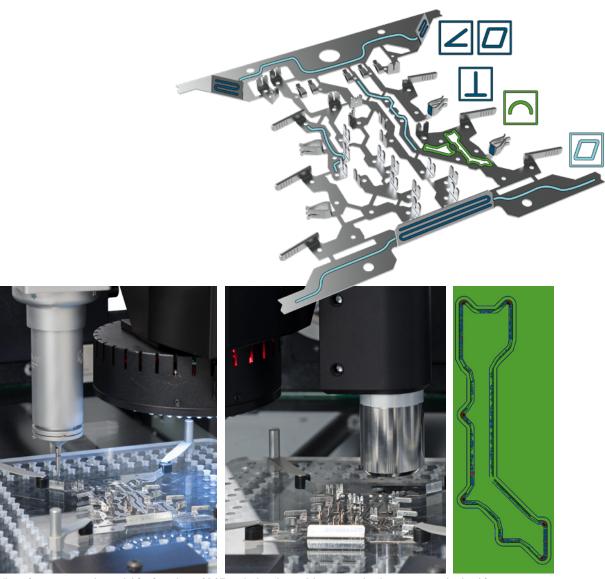
Stamped-bent insert lead frame

- Non-contact and contact sensing technologies combine to enable efficient form and profile measurements on any material.
- With the PC-DMIS multisensor metrology software measuring points captured by each sensor can be flexibly analysed and actionable information derived with ease.

2D contours (recesses for assembly) are measured quickly in a single shot or in contour scanning mode with the high-resolution Vision sensor and its telecentric LED back light illumination.

Line profiles of even the most delicate structures (flatness of connecting webs, cutting edge profile of contact flags) are scanned rapidly and independently of surface properties with the OPTIV CWS optical white light sensor.

For arbitrarily orientated features, tactile surface scanning with the high precision HP-S-X1C scanning probe provides 3D dimensions at an unprecedented combination of accuracy, flexibility and speed (perpendicularity of contact flags, orientation and flatness of distance flags).



Where form accuracy is crucial for function – GD&T analysis using multisensor technology on a complex lead frame.

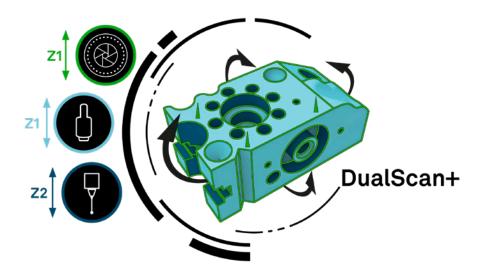


OPTIV M DualScan+

The cycle time improvement solution for complicated 3D components

OPTIV M DualScan+ reduces the time needed for the complete multisensor measurement of complex precision parts by combining a unique array of sensors with advanced flexibility in feature accessibility.





OPTIV Dual Z

Two independent sensor axes Z1 / Z2

Edge detection @ Z1
Lateral contour scanning @ Z1
Video autofocus @ Z1

Contact scanning @ Z2

- + Non-contact distance measurement @ Z1
- + Non-contact scanning @ Z1

Target application class

Geometric size, position, orientation, geometric form

+ Complex geometries and single-cycle complete part capture requirement

Typical part and feature characteristics	 Any material – rigid/deformable, multi-colour, opaque/transparent/reflective Microscopic features 3D elements and dimensional references distributed around the part Any surface finish – microstructured, coated Functional surfaces and freeform surfaces 3D microgeometries Spatially complex arranged measuring positions 	
Application examples	 Turbine blades (cooling holes) Small electrical household appliances (complex housings) Orthopaedic implants (bone plates and screws, spinal implants) 	 Micro cutting/stamping/forming tools Moulds and dies, EDM electrodes Electric vehicle charging plugs and connectors













Key application

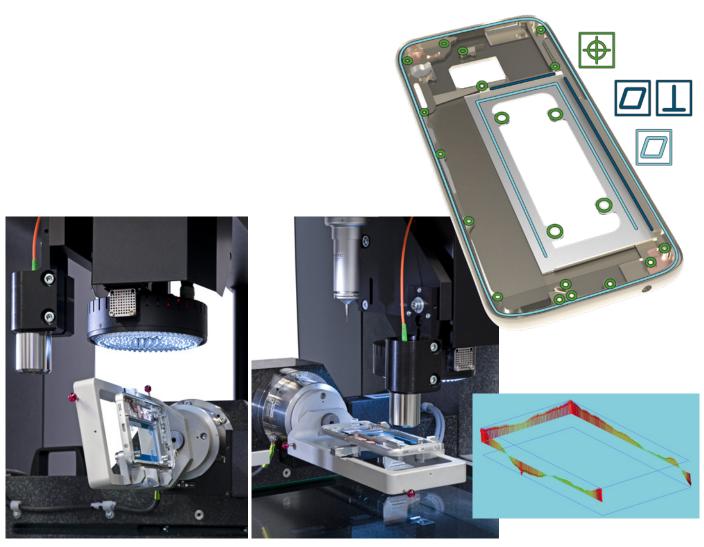
Smartphone housing

- Flexible sensor positioning ensures accessibility to the most complex 3D arrangements of features around a part without the need for time-consuming re-clamping or sensor exchange.
- Two independent sensor axes enable collision-free multisensor measurements without the need for mechanical sensor exchanges.
- Automatic measurement cycles deliver maximum throughput.

Lateral dimensions and 2D contours on the top and bottom of the housing (slots, recesses, screw bosses, webs) are measured using the Vision sensor in combination with the rotary table.

Different stylus configurations for the HP-S-X1C scanning probe allow for versatile tactile form measurements (flatness, roundness) on all sides of the housing including the front.

Program-controlled rotation of the housing into the measuring axis of the OPTIV CWS optical white light sensor with the rotary table enables non-contact flatness and profile form scans on freeform and deformable surfaces around the housing.

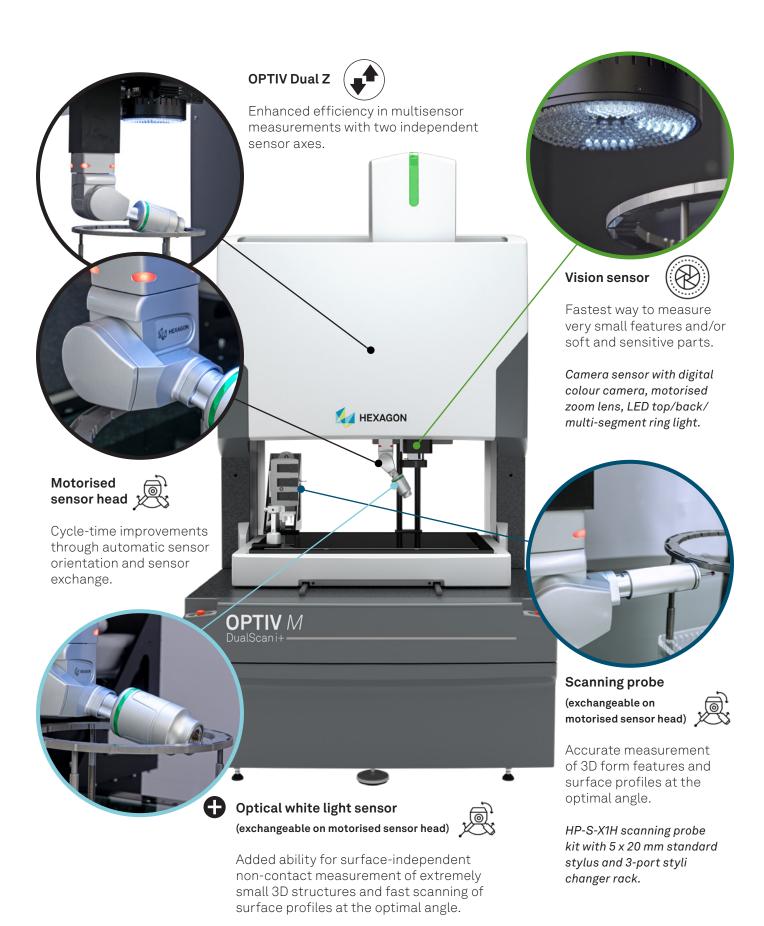


Increasing inspection process efficiency with OPTIV Dual Z technology – single-cycle multisensor measurement of a smartphone housing.

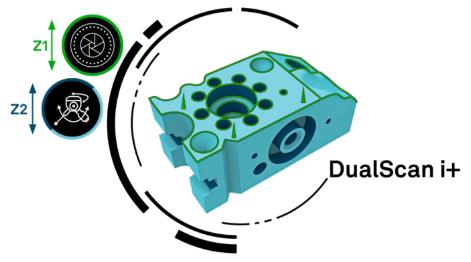


The ideal solution for single-cycle multisensor measurements of complex, large and heavy 3D parts

OPTIV M DualScan i+ offers measurement time improvements for an extended range of complex precision parts by deploying automatically exchangeable sensors in conjunction with an indexing probe head. This system guarantees optimum feature accessibility for large or heavy parts that must remain stationary within the measuring volume.



HP-OW kit with 2 mm sensor head HP-OW-2.14 and HR-R sensor changer rack with 3 ports.



OPTIV Dual Z

Two independent sensor axes Z1 / Z2

Motorised sensor head

Automatic sensor orientation / exchange

DualScan i+ Edge detection @ Z1

Lateral contour scanning @ Z1

Video autofocus @ Z1

Contact scanning @ Z2

- + Non-contact distance measurement @ Z2
- + Non-contact scanning @ Z2

Target application class

Geometric size, position, orientation, geometric form, complex geometries and single-cycle complete part capture requirement

+ Extended application range

Typical part and feature characteristics	 Any material – rigid/deformable, multi-colour, opaque/transparent/reflective Microscopic features 3D elements and dimensional references distributed around the part Any surface finish – microstructured, coated Functional surfaces and freeform surfaces 3D microgeometries Spatially complex arranged measuring positions Large and heavy parts 	
Application examples	 Bipolar plates for PEM fuel cells (flow-field geometry) Turbine blades (surface profile) Orthopaedic implants (hip and knee joint prostheses) Optical and technical glasses (lenses, prisms) Smartphones, tablet PCs, wearables (curved glass displays) 	









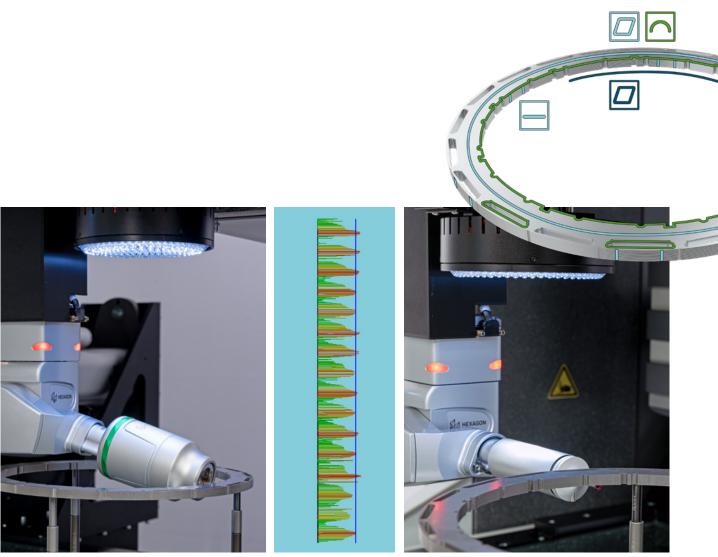


Key application

Rotor/stator stack for electric motors

- Independent movement of two sensor axes for maximum flexibility in accessing and measuring the geometric features of large or heavy parts.
- · Motorised sensor head for automatic sensor orientation at the optimal angle to the part.
- Styli changer rack for the use of different stylus configurations within a single part program.
- Sensor changer rack for automatic sensor exchange.

Vision sensor is used for quick part alignment and also for lateral position and contour measurements. HP-OW optical white light sensor allows for profile scans from any side or from top of the stacks. HP-S-X1H scanning probe covers profile scans on the bottom or inside holes.



Maintaining high levels of measurement automation through automatic sensor orientation and exchange – optimal accessibility to an assembled rotor/stator stack for electric motors.

Enhancement packages

Smart features for targeted productivity enhancements

A range of enhancement packages allow users to even further customise their OPTIV M experience to meet the needs of the applications that are important to them, available pre-installed or as later additions.

Auto Create

Automated measuring routine creation online and offline – extract information right from CAD and eliminate data interpretation and input errors.

PC-DMIS Offline

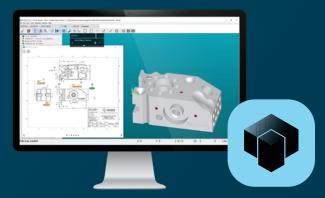
A virtual CMM environment designed to enhance productivity. Users can develop, test and debug inspection routines away from the CMM using CAD models, including simulated program execution with 3D simulated collision checks and sensor path optimisations.

Direct CAD Translator | Direct CAD Interface

PC-DMIS facilitates the seamless integration of 3D CAD data in many formats such as IGES, STEP and DMIS. Direct CAD Translators (DCTs) translate a native CAD system's 3D model into the PC-DMIS internal CAD format without having to install or license the respective CAD system. Direct CAD Interfaces (DCIs) link directly to a proprietary CAD system and let users work directly with their models from PC-DMIS with no translation. No other metrology software comes close to giving users this kind of versatility and flexibility in linking to variety of common native CAD systems.

GD&T Selection

Automatically translate GD&T data embedded as Product and Manufacturing Information (PMI) in the 3D CAD model into measurement routines within PC-DMIS Offline. With the industry-first innovative feature 'GD&T Selection from File', advanced OCR technology is used to read the GD&T data from scanned 2D blueprints and import it directly to the measurement routine with just a few clicks. Upon loading a part print to PC-DMIS, a simple widget feature guides the process from start to finish, driving programming efficiency and eliminating data interpretation and input errors.



GD&T Selection from File: Shorten measurement routine creation time by automating the input of GD&T data from part prints.

Cycle Time

Keep up with the demands of your production process – maximise inspection throughput by reducing the setup and execution time of a measurement part program.

Path Optimiser

Users can create features all over the part to be measured, irrespective of order. Path Optimiser will automatically calculate the order of the features and the move points in order to create the most efficient measurement path. This significantly speeds up both routine creation and execution.

Flex Inspect

Flex Inspect extends the capability of PC-DMIS' Mini Routines and Groups and allows users to easily set up any portion of a measurement routine for execution and reporting without an alignment dependency. The desired dimensions or features can be dynamically selected at execution time.

MultiCapture

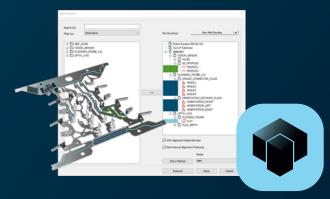
During measurement routine execution, MultiCapture automatically finds all elements that fit within the same field of view. The simultaneous acquisition and measurement accelerate the inspection process by up to 70%.

Template Matching

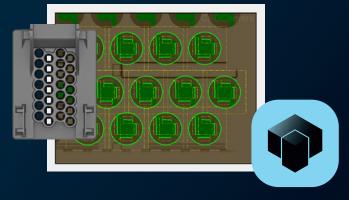
Template Matching is designed to allow the user to define a master image of an area of interest that could be used to search the field of view prior to any edge detection being performed for feature measurement. This improves measurement repeatability by removing factors such as location deviations or part variability.

Fly2 Mode

The Fly2 Mode trajectory optimisation feature automatically optimises sensor motion paths. This reduces the time taken to execute a measurement program to help maximise inspection throughput. This optimisation also contributees to reduced internal machine stress resulting in lower maintenance and downtime requirements.



Flex Inspect: Easily execute portions of a routine to support specific inspection tasks through production.



MultiCapture: Cut measuring times by simultaneously measuring densely arranged features.

Industrial Integration

Measure near the production line – detect process variations earlier and apply corrective actions faster.

Inspect Automate - Barcode/Pallet/Playlist

Inspect Automate integrates a group of functions that are essential for the implementation of automated inspection workflows near the production line. With only minimal training, production-level operators can quickly select and execute a measurement routine or routine playlist using the intuitive Inspect interface. Any Windows compatible barcode or QR scanner can be used, not only speeding up workflows but also reducing operator error caused by manual input.

With an additional type of playlist, support for pallets is included in Inspect Automate, allowing the operator to configure existing measurement routines for a pallet run without having to manually adapt them.

Notification Centre

Easily keep track of multiple inspection processes, maximise throughput and improve machine uptime with configurable notifications. Notification Centre is an independent software that allows PC-DMIS users to configure the messaging lights on OPTIV M CMMs, associating colours with specific inspection events from PC-DMIS. In addition to the lights, users can also configure multiple sound events from the PC speakers for quieter lab environments.

I/O interface (incl. cabling)

I/O interface facilitates the integration of OPTIV M into individual production environments through a combination of components working together to ensure seamless interfaces (emergency signals, safety signals, CMM status) with the production equipment.



Inspect Automate: Take the complexity out of measurement by simplifying measurement routine access and execution

Traceability

Comply with the requirements of highly regulated industries – get confidence in the integrity and reliability of your measurement results.

PC-DMIS Protect

PC-DMIS Protect allows the user to protect and manage their valuable measurement routines while creating an auditable trace of any future changes. This added level of control and protection helps manufacturers work towards process compliance and supports them in their accreditations or certifications according to specific standards such as FDA 21 CFR Part 11 and ISO 13485 in the medical and health sector or IATF 16949 (Clause 8.5.2 Identification and Traceability) in the automotive industry.

PULSE

PULSE uses a network of sensors to provide real-time monitoring for metrology environments. The system helps ensure measurement data integrity by notifying users of changes in temperature, humidity, vibration, air pressure and luminosity that might affect measurement results. This makes PULSE ideal for automated inspection setups ensuring high-volume measurements are performed in optimal conditions.

PULSE seamlessly integrates with Metrology Asset Manager, Hexagon's cloud-based subscription solution for remote asset monitoring that provides CMM health and performance information in real-time from a browser-based dashboard or mobile device and comes standard on any OPTIV M.



PC-DMIS Protect: Trace back any changes to a protected measurement routine to a user and time for future audits.



PULSE: Ensure the integrity of measurement data by constantly monitoring the metrology environment.

Reporting

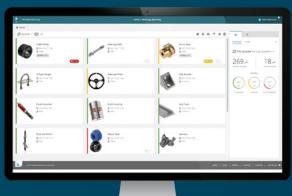
Informed and timely decision making – extract actionable information from your measurement data.

Metrology Reporting

Metrology Reporting is a cloud-based software designed to centralise reporting functionality, making it accessible for all users through a single, scalable platform. Manufacturers gain remote access to real-time dimensional data from any connected OPTIV M CMM, triggering an increase in productivity through faster and better-informed decision making.

In addition to the data itself, Metrology Reporting offers additional insight and data analysis, providing users with essential intelligence that could otherwise be missed. Metrology Reporting integrates with PC-DMIS, as well as other solutions available on the Nexus platform such as Metrology Asset Manager.







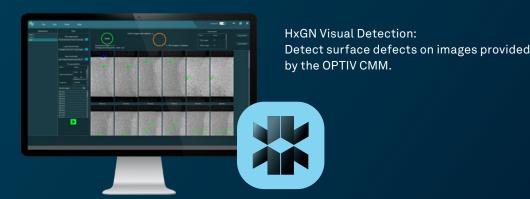
Metrology Reporting: Improve productivity with automated easy-to-use data insights.

HxGN Visual Detection

Automated surface defect detection – trust the integrity of high-quality surface finishes.

HxGN Visual Detection is an automated surface inspection application capable of detecting defects such as scratches, cracks and dirt on a wide range of materials like glass, metal, plastics and ceramics. It uses advanced AI machine learning as an enabler of greater automation in manufacturing. HxGN Visual Detection quickly learns from just a few sample images featuring a range of defects in order to recognise and identify manufacturing errors at key stages of production.

HxGN Visual Detection is ready for use with OPTIV M multisensor CMMs and can be incorporated into PC-DMIS Vision metrology workflows to deliver dimensional measurement and surface inspection in a connected workflow.



Automation

Intelligent workpiece feeding and loading solution for high measurement automation and CMM utilisation.

TEMPO automated part loading system

TEMPO, the automation enhancement system, helps manufacturers integrate quality assurance into smart production environments. TEMPO is an off-the-shelf solution for automated part loading, queuing and unloading. Ready to drive efficiencies with any OPTIV M multisensor CMM,* TEMPO enables continuous measurement for hours or days at a time without operator intervention. From its ease-of-use to automatic identification of out-of-tolerance parts, TEMPO is designed to maintain inspection throughput while operators focus on tasks away from the CMM.





TEMPO: Enhance CMM workflow with off-the-shelf automatic part loading.

World-class products to rely on

Drawing on decades of research and development experience, technology from Hexagon's Manufacturing Intelligence division is built on a long history of outperforming technological innovation. Deriving quality from experience to drive productivity is what keeps Hexagon in front and able to deliver first-class solutions for industries around the world.

Along with the assurance of ten years of serviceability, owners of OPTIV solutions from Hexagon benefit from a factory warranty of up to 36 months – our guarantee that our technology will reliably meet users' needs now and in the future.

World-class support delivered locally

The international presence of Hexagon guarantees comprehensive aftersales support and services across the globe. With the largest dedicated service team of any metrology equipment manufacturer and an emphasis on locally delivered solutions, Hexagon is unmatched from service, repair, certification and calibration through operator training and software maintenance and upgrades.



Metrology Asset Manager

Real-time performance data in a centralised user-friendly dashboard, now as standard

Hexagon's Metrology Asset Manager delivers a simple, accurate and reliable way to monitor and analyse how key assets are performing via a centralised, user-friendly dashboard, whether on a single site or distributed across multiple locations around the world.

This future-proof solution provides manufacturers with easy and intuitive access to important information in real-time to allow for better informed decision making. Smart measurement and smart monitoring are the future of smart manufacturing.

- Monitor and manage device status, usage and performance
- · Securely access information from anywhere in real time
- Identify production bottlenecks and other sources of inefficiency
- Receive customisable critical event notifications
- Track assets across a single site or at multiple worldwide locations

Every OPTIV M comes bundled with a one-year Metrology Asset Manager Advanced subscription. Contact your local Hexagon representative for more details.









Accessories

Making the most of multisensor technology

Driven by a truly end-to-end approach to innovation, Hexagon's wide range of accessories for OPTIV M products reaches from added functionality to improved productivity while covering every need in between.





Hexagon is a global leader in digital reality solutions, combining sensor, software and autonomous technologies. We are putting data to work to boost efficiency, productivity, quality and safety across industrial, manufacturing, infrastructure, public sector, and mobility applications.

Our technologies are shaping production and people-related ecosystems to become increasingly connected and autonomous – ensuring a scalable, sustainable future.

Hexagon's Manufacturing Intelligence division provides solutions that use data from design and engineering, production and metrology to make manufacturing smarter.

Learn more about Hexagon (Nasdaq Stockholm: HEXA B) at **hexagon.com** and follow us **@HexagonAB**.