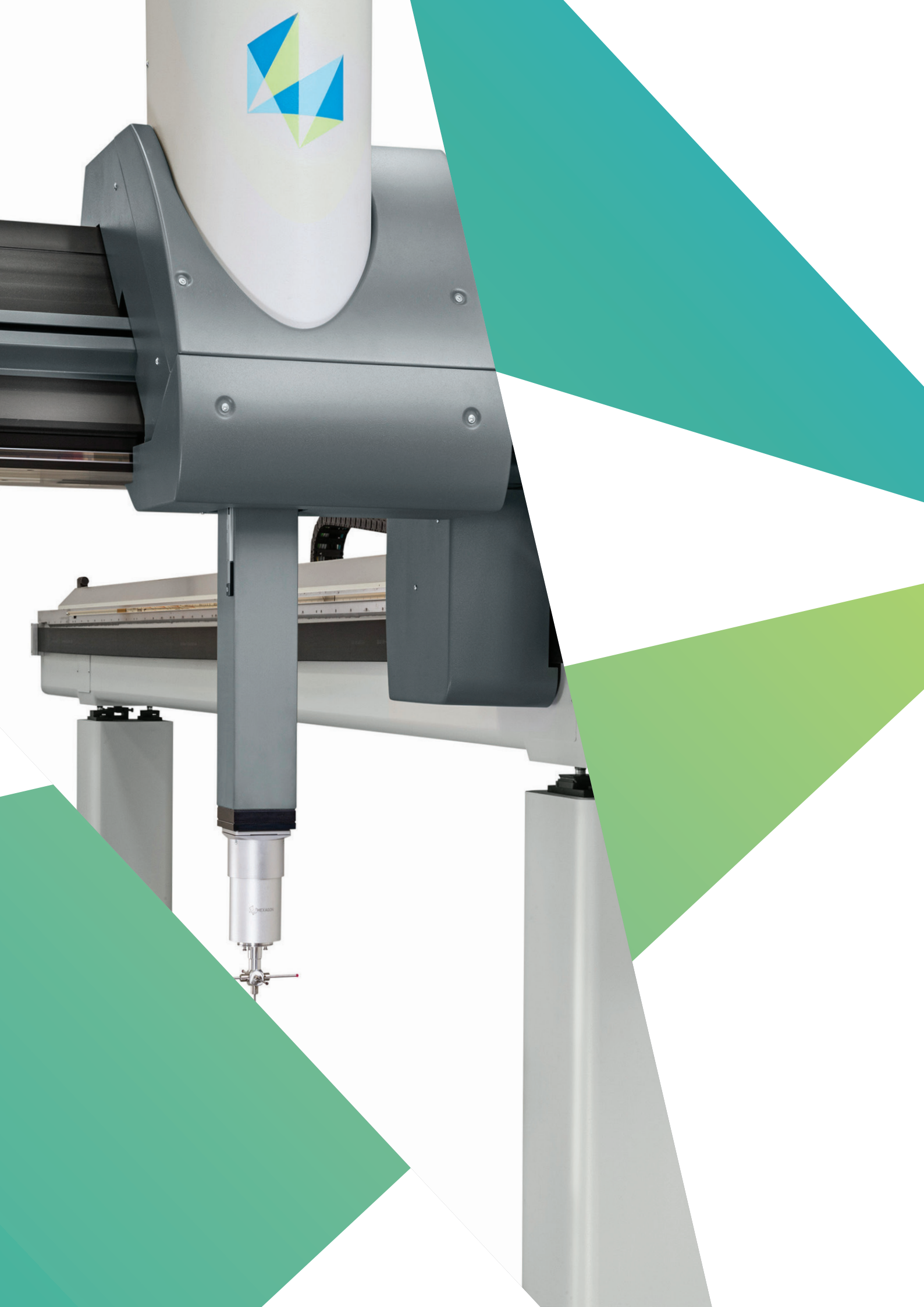
HEXAGON

Brochure

Gantry line

Large volume coordinate measuring machines



Exceptional expertise in large size CMMs

Hexagon's gantry range of CMMs brings accurate and efficient measurement to diverse inspection applications on large-sized components across many industries.

The story of these giants is not only about their capacity; the range features quality design, robust materials, a highly stable mechanical structure and innovative technologies to ensure high accuracy, fast measurement, and high throughput in production cells, the production floor or the measuring room.

Hexagon's gantry CMMs come in a variety of sizes and from cost-effective entry models to ultra-high accuracy machines, all strengthened by versatile sensor options. These include precise tactile probes for single-point inspection and high-speed scanning, and non-contact optical sensors, allowing the right sensor to be chosen for each application.

The gantry architecture allows for simple loading and integration with part transportation systems, along with easy access to the measuring volume.

With a rich palette of performance-enhancing configurations and options, these CMMs offer a solution for any large application, all supported by an extensive service and support network.


ALPHA 2.0
HEXAGON

ALPHA 2.0

Bridging the price/performance gap

An innovative line of cost-effective, medium-capacity multisensor gantry CMMs, the ALPHA 2.0 combines high throughput and high accuracy with excellent operating reliability and minimal maintenance. The CMM is available in Classic and Performance versions.

ALPHA 2.0 Classic is an all-purpose flexible CMM for the dimensional inspection of large castings and machined parts. When equipped with a high-productivity 3D scanning laser sensor and continuous servo wrist options, the CMM:

- Can rapidly acquire millions of data points from complex contoured shapes
- Is ideal for die and mould manufacturing support

ALPHA 2.0 Performance is a high-performing gantry CMM that, thanks to its high-rigidity silicon carbide Z spindle and sophisticated multisensor temperature compensation system, guarantees high accuracy and ease of use under all operating conditions.

Both models can be equipped with optional bellows and covers, which offer machine protection from airborne contaminants when the machine is used on the shopfloor.


DELTA OPERA

DELTA OPERA

Combining the best of gantry and bridge-type CMMs

With its unique half-bridge and half-gantry open structure, DELTA OPERA delivers unparalleled part loading efficiency and accessibility for maximised productivity.

Like in a bridge CMM, even the largest workpieces can be easily and quickly loaded from the front, rear and side of the machine. At the same time, DELTA OPERA offers the large measuring volumes typical of gantry-type CMMs.

As well as making part loading simpler and safer, the CMM offers fast, accurate, high-precision measurement to save inspection and production cycle times.

DELTA OPERA is ideal for measuring large parts in aerospace, automotive, power and energy and general machinery industry sectors.

- Flush-floor installation dramatically simplifies loading and unloading operations
- The open structure offers excellent part visibility, which can be further enhanced with optional LED lighting
- Offers a wide thermal operating range of 16-26°C for shop floor environments
- Smaller footprint than equivalent traditional gantry CMMs


DELTA
HEXAGON

DELTA SLANT

Performance across the board

DELTA SLANT is a mid-to-large-sized gantry CMM that comes in a range of sizes and accuracies at unbeatable price/performance ratios. These machines excel in the high-accuracy inspection of large machined parts combining high throughput, accuracy and repeatability with excellent reliability when operating in an open shop environment.

The CMM adopts Hexagon's proven technological innovations, including:

- An extruded aluminium main X traverse beam with patented TRICISION® design that provides superior metrological and dynamic performance
- The dual encoder on the Y beams
- Structural multisensor temperature compensation

The CMM is available in the Classic and Performance versions. The flexible Classic measurement system perfectly blends metrology performance, versatility and affordability.

DELTA SLANT Performance comes with real-time correction of up to 26 geometrical parameters and is ideal for applications requiring higher accuracies and shorter measurement cycles.

An optional shop floor kit consisting of covers and bellows for the whole machine structure is available for both models to enable use in a workshop environment without air-conditioned enclosures.

LAMBDA SP

The hi-tech giant CMMs

LAMBDA SP is a line of very large measuring machines designed for operation in industrial environments. They excel in the high-speed, high-accuracy inspection of huge components, such as marine engines, aircraft frames and turbines, that require open, modular, easily customisable structures with virtually unlimited measuring volumes.

The outstanding performance of these CMMs results from advanced technical solutions, including:

- A dual drive/encoder system on the main carriage
- Slant bridge technology on the X-axis for better stability and dynamic performance
- Multisensor structural temperature compensation that ensures measuring accuracy over an operating temperature range of 16 to 26°C

In addition, wrap-around thermally insulated covers and bellows protect all axes and pillars.

Leitz PMM-F and Leitz PMM-G: Ultra-high accuracy on a grand scale

Accuracy and precision for large applications with the tightest tolerances

The Leitz PMM-F and Leitz PMM-G are Hexagon's ultra-high accuracy large-volume CMMs for use when the highest accuracy and precision are needed. With minimised measurement uncertainty, they ensure reproducible inspection results in the measuring room and production environment to enable confident decision-making in production and testing processes.

Typical applications for these CMMs include:

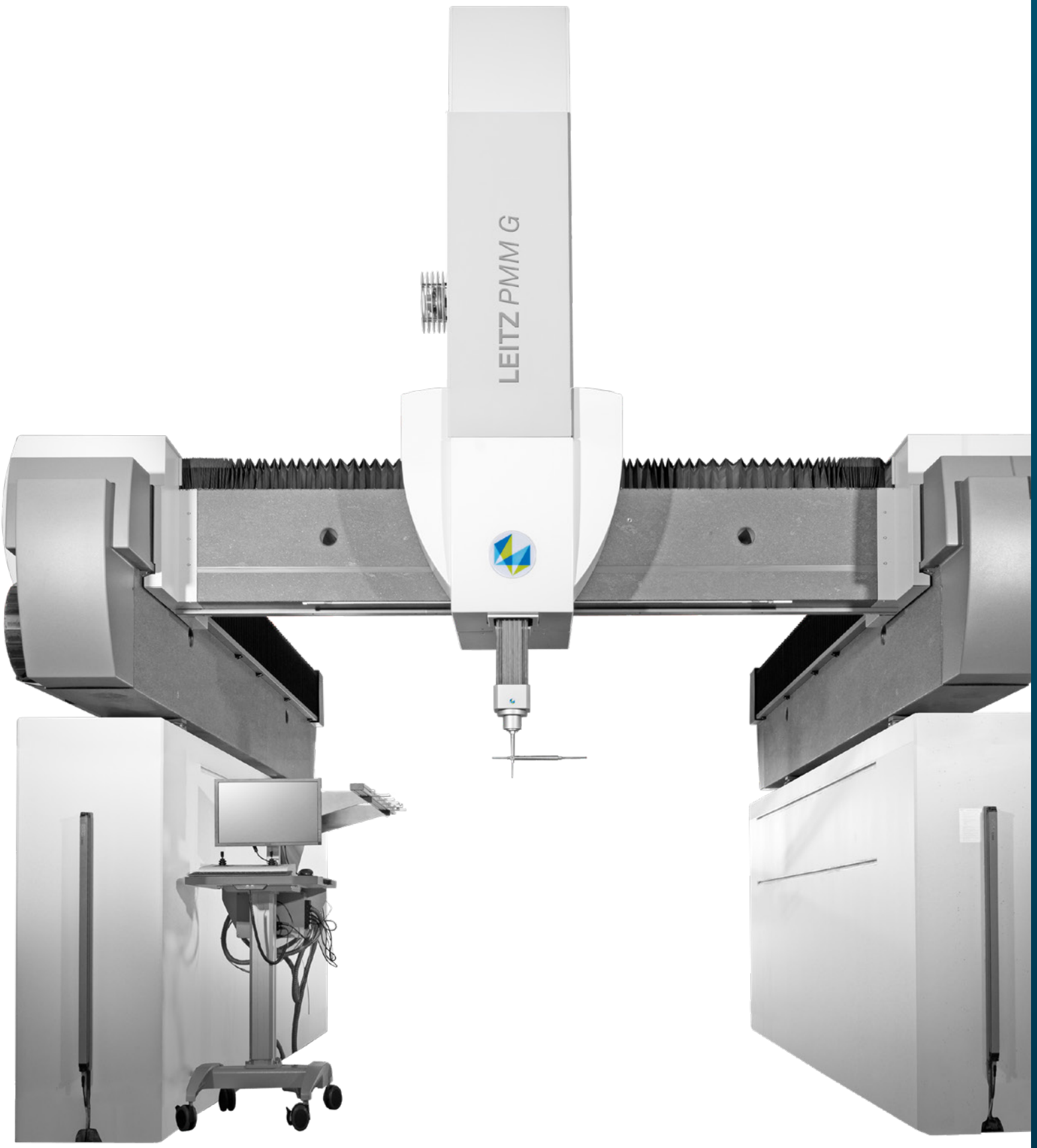
- Inspection of any geometry – part inspections for manufacturing, quality control centres and R&D
- Measuring gears, gear segments and gear racks. In conjunction with QUINDOS, all types of gears can be measured
- Form testing – quality control of form tolerances and non-contact inspection of large high-precision surfaces

Both machines offer high probing frequencies, high acceleration and outstanding part throughput for short measuring times and lower production costs.

The Leitz PMM-F and Leitz PMM-G are available with the SENMATION automated sensor exchange system.

An optional rotary table allows measurement using continuous 4-axis scanning. Rotary tables enable access to workpieces from any angle so highly complex parts can be inspected quickly with a high point density.


LEITZ PMM F
HEXAGON METROLOGY


LEITZ PMM G

PMM - F

Accuracy meets throughput

The PMM-F offers outstanding quality assurance of medium-sized and large precision parts and gears with maximum accuracy and high throughput.

The overhead structure with minimised mass combined with the drive design allows measuring speeds and throughput previously unthinkable for machines of this size:

- Extremely high acceleration up to 3 000 mm/s2
- Travel speeds of up to 600 mm/s
- Very high throughput means lower testing costs; the PMM-F is more economical than conventional measuring machines in this class

The PMM-F is characterised by excellent long-term stability and measurement performance; the spindle drive units are non-wearing, the dual drive system ensures consistently high accuracy within the entire measurement volume, and the rigid granite-based design, together with an active pneumatic vibration dampening system, make the machine impervious to shocks and vibrations.

The PMM-F does not require a special foundation; it is easy to install anywhere in the factory – in the measuring room or the production environment, at temperatures up to 24°C.

PMM - G

Maximum accuracy in size xxl

The PMM-G is designed for complex measurement tasks and maximum accuracy in the quality and process control of very large workpieces.

The characteristic feature of the PMM-G is the overhead moving gantry with minimised moving masses and driving forces as close to the centre of gravity as possible. The U-shaped reinforced concrete machine base ensures optimum functioning, and the machine rests on an active pneumatic dampening system.

These designs ensure maximum accuracy across the whole measuring range, maximising reproducibility with high throughput.

The PMM-G can be equipped with Z-rams ranging from 1 200 mm up to 3 000 mm, offering the ideal measuring system for a variety of applications, such as measuring a large engine construction.

With a short Z-axis, the PMM-G complies with all the requirements of a gear measuring centre and delivers highly accurate measurement results. The PMM-G is optimised for measuring large gears with maximum diameters of 4 450 mm.

The automatic levelling system of the foundation enables the use of rail carriages for easy loading and unloading of the machine.

Probes and sensors

High performance for every application

Probe heads

The probe head forms the heart of every coordinate measuring machine. Combined with a sensor, it generates the measurement data during inspection cycles. Hexagon offers a range of CMM probe heads to accurately position the probe during measurement and ensure easy part access.

HH-A-T5 | HH-AS8-T5

These motorised probe heads are capable of indexing in 5° increments. The heads feature a number of innovations including an embedded controller and capacitive crash protections, while positioning is achieved by use of a Hirth gear. The probe heads can be mounted on the CMM with a shank or flange or directly into the ram of the machine. They offer high speed operation and high rotational torque that can achieve 3 024 unique positions.

Available for ALPHA 2.0, DELTA SLANT, DELTA OPERA, LAMBDA

HH-A-T2.5 | HH-AS8-T2.5 | HH-A-H2.5 | HH-AS8-H2.5

These motorised probe heads are capable of indexing in 2.5° increments and can achieve 12 240 unique positions. The heads feature a number of innovations including an embedded controller and capacitive crash protection, while positioning is achieved by use of a Hirth gear. Like the T5 probe heads (above) they can be mounted on the CMM with a shank or flange or directly into the ram of the machine. The H2.5 versions support heavy styli configurations and have a maximum sensor extension of 750 mm for measurement at great immersion depth.

Available for ALPHA 2.0, DELTA SLANT, DELTA OPERA, LAMBDA | HH-AS8-T2.5: PMM-F and PMM-G

Tactile measurement

Tactile sensors from Hexagon are well-known for their dynamics and accuracy, supporting single-point probing, self-centring 3D scanning and variable high-speed scanning for fast and accurate form, profile and surface measurements of complex geometries.

Touch trigger probes: HP-TMe, HP-Te, HP-THDe, HP-T-RP

Hexagon's families of touch-trigger probes perform fast and repeatable 3D point measurements while being cost-effective and easy to use. Thanks to various trigger forces and their compact and robust design, touch trigger probes can be flexibly used in diverse situations, from applications with tight tolerances to tasks requiring high-speed measurement and high point density.

Available for ALPHA 2.0, DELTA SLANT, DELTA OPERA (LAMBDA: HP-TMe and HP-Te only)

Flexible scanning probes: HP-S-X1 with motorised probe head

HP-S-X1 scanning probes are combined with an articulating probe head featuring many indexable positions, enabling easy access when measuring highly complex workpieces. The probe and head are equipped with a kinematic joint, allowing automated probe changes. The HP-S-X1S supports a maximum axial stylus length of 115 mm and the HP-S-X1H up to 225 mm.

Available for HP-S-X1S: ALPHA2.0 , DELTA SLANT, DELTA OPERA, LAMBDA | HP-S-X1H: PMM-F and PMM-G

Fixed scanning probes: HP-S-X5 | HP-S-X5HD

HP-S-X5 fixed scanning probes measure complex geometries at the tightest tolerances with high precision and repeatability. The system enables 3D probing, supports styli configurations of up to 500 mm in length and 500 g in weight. The HD version supports up to 650 g and a maximum sensor extension of 800 mm. They feature a proprietary anticollision system offering extra protection for the head. The system is compatible with the SENMATION automatic exchange interface.

HP-S-X5: LAMBDA | HP-S-X5HD: ALPHA 2.0, DELTA SLANT, DELTA OPERA, Leitz PMM-F and PMM-G

Highly accurate and flexible heavy-duty probe: LSP-S2

The LSP-S2 fixed scanning probe combines maximum accuracy with outstanding high-speed scanning properties, even when using sensor extensions up to 800 mm in length and 1000 grams in weight.

Available for Leitz PMM-F and PMM-G

Surface and roughness scanning: PROFILER R

The PROFILER R measures all common roughness parameters through tactile surface scanning. The sensor is adapted to the HP-S-X5 HD or LSP-S2-WL scanning probe heads and is automatically integrated into the measurement process using the standard stylus changer interface.

Available for Leitz PMM-F and PMM-G

Optical measurement

Optical sensors add flexibility to a metrology setup. They are typically used to optimise measurement or to inspect objects that contact-based probes cannot. Touch-free measurement allows the inspection of sensitive and soft materials with no risk of damaging the workpiece surface. Several non-contact sensors are available for gantry CMMs, including a vision camera measurement system, and interferometric and laser scanning sensors for various applications.

Laser scanning sensor: HP-L-10.10

The HP-L-10.10 laser scanning sensor delivers highly accurate results combined with the highest speed and unique handling features. It's especially powerful when measuring complex surfaces and workpieces made of materials that are difficult to measure. The HP-L-10.10 collects up to 600 000 points per second with a probing form error of 8 microns, which makes it the most accurate laser scanning solution on CMMs.

Available for ALPHA 2.0, DELTA SLANT, DELTA OPERA

HP-C vision sensor

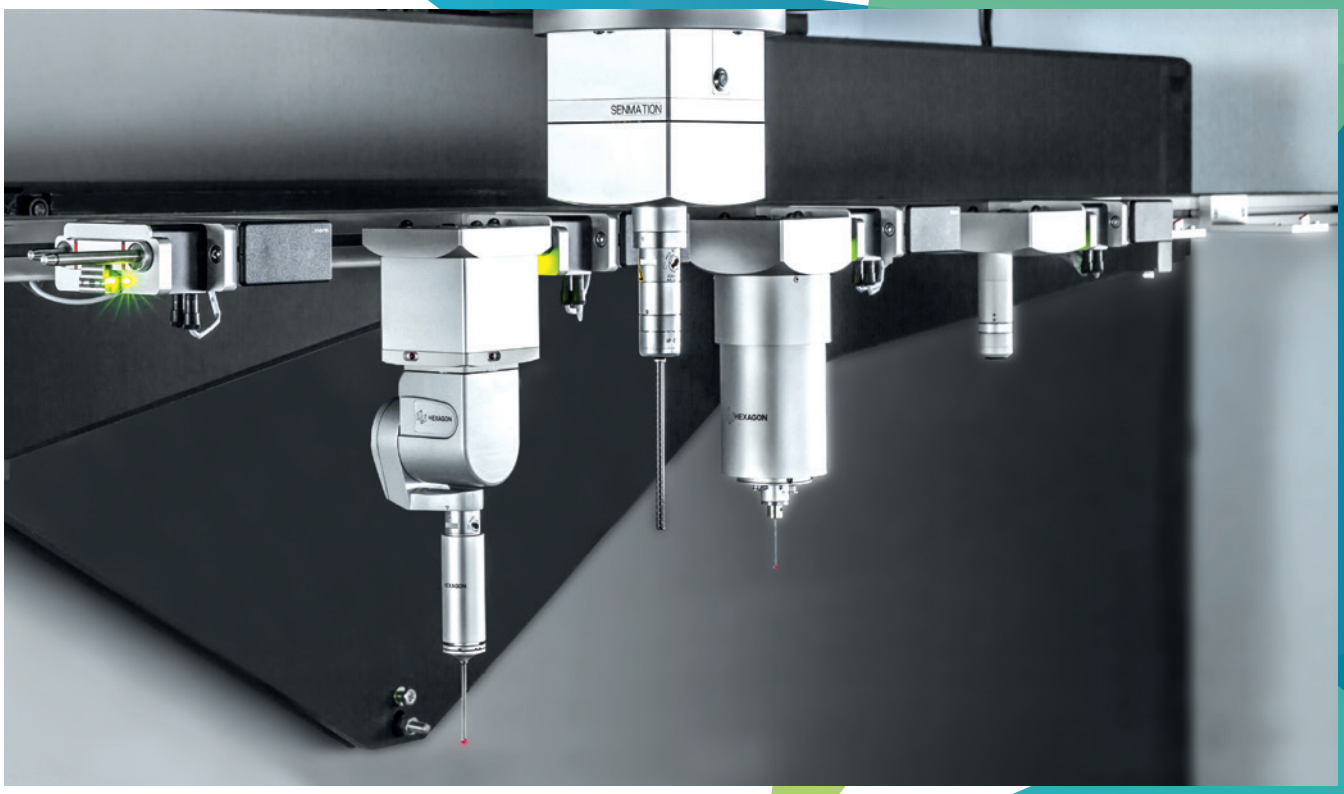
HP-C is a vision camera measurement system. It can measure small features and sensitive or easily deformed components and deliver high throughput for applications where image capture is faster than probing. It is equipped with a high-resolution camera and a built-in illumination system. Thanks to the working distance of 110 mm and two zooming options, the HP-C is a highly flexible solution, especially when features are too small for tactile probing.

Available for ALPHA2.0, DELTA SLANT, DELTA OPERA

HP-O optical sensor

The high-resolution HP-O optical sensor range delivers the highest accuracy making it perfectly matched to ultra-high accuracy CMMs. Based on interferometric optical distance measurement, the sensor measures exceptionally well on a wide variety of different materials, including metallic technical surfaces. The HP-O is used for both single-point probing and continuous scanning tasks.

Available for Leitz PMM-F and PMM-G



SENMATION

Intelligent sensor automation

To allow a CMM to perform the most complex measurement tasks using multiple sensor types, Hexagon developed the SENMATION intelligent sensor automation system.

With fully automatic sensor exchange, SENMATION transforms a CMM into a multisensor inspection device capable of completing the most intricate measurement tasks. The system enables the use of a wide variety of tactile and optical sensors within the same measurement routine, ensuring the right type of sensor is used for every part feature.

The flexibility of multisensor measurement delivers large productivity and quality benefits in applications across many industries.

Benefits

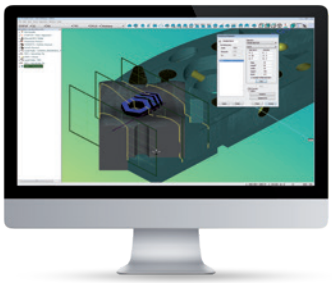
- Automatic sensor detection
- Fully automatic exchange of sensors within a measurement routine
- Sensor changes with no need for recalibration
- Enables maximum flexibility and full CMM capacity utilisation
- Adaptability to future technologies and processes

Available on Leitz PMM-F and PMM-G

Software

Leading-edge measurement software

Gantry CMMs are completed by powerful metrology software. Two solutions are available: PC-DMIS and QUINDOS. User-friendly and CAD-based, both programs offer efficient programming and evaluation of measurement data.



PC-DMIS

PC-DMIS offers a range of features to make inspection more effective and save time. Inspection sequences for large parts can often be time-consuming, but PC-DMIS software enables you to easily create optimised measurement routines that significantly reduce cycle times. Offline capabilities allow engineers to create routines without occupying the CMM. This enables preparation of the part program without needing the physical workpiece, so measurement can start straight away once the part is ready and available. And the software's customisable reports and mobile alerts allow users to ensure the right person gets the right data at the right time.

QUINDOS

QUINDOS is the specialist, expandable software that sets the standard for special geometry metrology. Developed to work in partnership with Hexagon's ultra-high accuracy measuring machines, QUINDOS enables nearly every measurement task to be solved for a wide variety of different components. QUINDOS can be freely configured for any measurement requirement and expanded later if necessary, using any combination of over 50 available options. All performance and evaluation of measurements are carried out in accordance with the respective national and international standards.

QUINDOS modules for advanced gear inspection

The QUINDOS options for gear measurement have the ability to measure gear wheels, bevel gears and gear-cutting tools and much more even without a rotary table. The applicable tolerance standards are included in the options. QUINDOS Gears also supports the pallet measurement option for gearing to ensure high throughput.

Accessories

Making the most of 3D metrology

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

Hexagon's Manufacturing Intelligence online shop offers a streamlined search, order and delivery service for a wide range of accessories and spare parts in many countries worldwide.

Whether you're buying single items or in bulk, shop.hexagonmi.com takes the time and stress out of securing the measuring equipment you need.

Please direct any questions about Hexagon products or accessories to an authorised local sales representative to receive guidance and assistance in making an appropriate purchasing decision.

Visit our shop

Service and support

World-class products to rely on

Drawing on decades of research and development experience gantry 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.

That's why every gantry product in this brochure comes with a 24-month factory warranty as standard, as well as a guaranteed 10 years of serviceability through official Hexagon service channels.

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.

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.