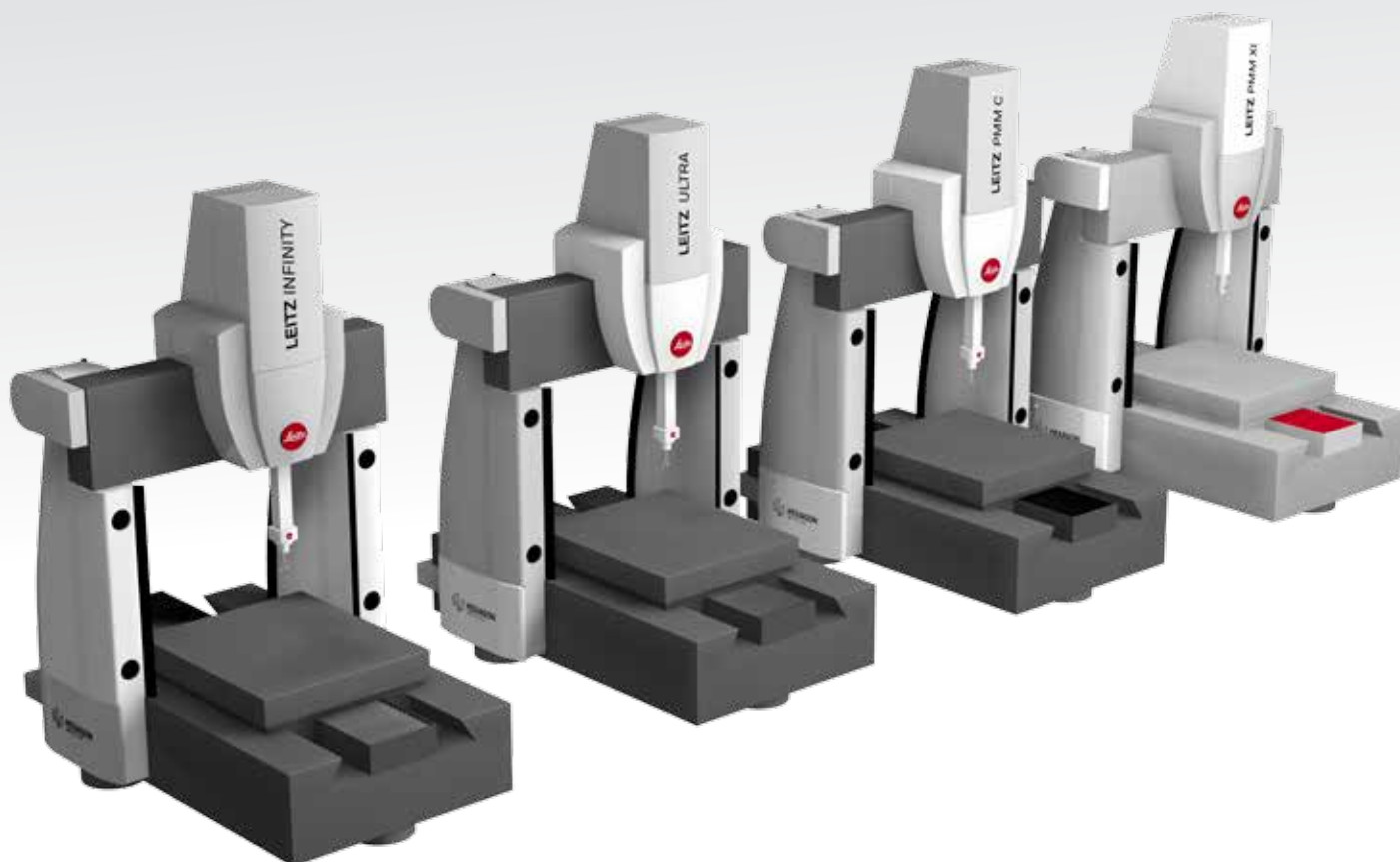




# LEITZ PMM-C LINE

Ultra high accuracy coordinate measuring machines



# LEITZ INFINITY - THE MOST ACCURATE COORDINATE MEASURING MACHINE IN THE WORLD



# CRUCIALLY MORE ACCURATE

Manufacturing companies have to overcome many different challenges. Products must be cost-efficient and manufactured to high quality standards. That means: processes must be continuously improved with waste and reworking being reduced. Leitz PMM-C coordinate measuring machines provide solid information and give a vital stimulus – for development, manufacture, assembly and quality assurance.

These coordinate measuring machines excel via their very high accuracy which is stable over the long term. Using these machines, you can reliably determine whether your parts meet the specified requirements. Short measuring times and high part throughput mean accelerated decision making. One feature that makes this possible is Variable High-Speed-Scanning. The Leitz PMM-C series allows decision-making based on a solid foundation.

# HIGH DEMANDS

The Leitz PMM-C series covers all applications in small, medium or large companies. When precise measurements of parts are required, one turns to the fast and high precision Leitz PMM-C line.

## Examples:

- Optics, precision engineering, machine engineering, automotive, electrical technology, aerospace
- Precision parts of all sizes: e.g. extremely delicate lenses and copper surfaces; powertrain components: transmission housings, gears, shafts, stepped transmission parts, production tools; prismatic parts; parts with highly complex geometries; tight-tolerance parts
- One-off or small batch measuring for applications such as prototype construction, production control in the measuring room, calibration laboratory work

The Leitz PMM-C series is more than a family of high-precision coordinate measuring machines. Their flexibility allows them to replace form testers, gear and camshaft checkers, and other specialist machines.









LEITZ PMM-X1



# AN ACCURATE FOURSOME

Four models make up the Leitz PMM-C series: from the new Leitz PMM-Xi to the most accurate 3D measuring machine of its class, the Leitz Infinity, which boasts a basic accuracy of 0.3 microns. You are sure to find the right Leitz PMM-C for your application.

Model	Description	Accuracy (µm)	Probing Frequency	Sensor Selection
Leitz Infinity 	The most accurate 3D coordinate measuring machine in the world, compatible with tactile and optical sensors, active pneumatic damping, can also be used in the calibration laboratory	0.3 + L / 1000	20/min	LSP-S4 Leitz Precitec LR
Leitz Ultra 	High accuracy, efficient, Variable High-Speed-Scanning sensors, active pneumatic damping	0.4 + L / 850	20/min	LSP-S2 LPS-S4 Leitz Precitec LR
Leitz PMM-C 	The original model of the series, accurate and highly dynamic, Variable High-Speed-Scanning sensors and optical sensors, a wide variety of measurement ranges	from 0.5 + L / 700	40/min	LSP-S2 LSP-S4 Leitz Precitec LR
Leitz PMM-Xi 	The cost-efficient model of the series, accurate and dynamic, many measurement ranges, especially suitable for small and medium-sized enterprises	from 0.6 + L / 550	25/min	LSP-X5

# SOLID AS A ROCK

Every detail of the Leitz PMM-C series shows the emphasis placed on measurement certainty. The characteristic feature of the series is the Closed Frame design, which is comprised of a solid granite base, a fixed portal with cast iron pedestals and a granite crossbeam.

Features	Benefits
Solid design: granite base, fixed portal of cast iron with a granite crossbeam	Compared to aluminium, granite shows hardly any movement with temperature fluctuations. It ensures long-term stability, high stiffness of the measurement axes and consistent accuracy over the entire measurement volume.
Travelling measuring table on pre-loaded air bearings with centrally positioned spindle drive	The spindle drive ensures constant dimensional relationships and efficient movement sequences with no tilting or twisting.
Decoupled X and Y axes	Deviations in the guidance of one axis has no effect on the other axis. For quick correction and restart.
Servo-drives with recirculating ball screws	These accelerate rapidly while retaining positional accuracy, reaching top speeds even over short movement paths.
Supporting and guiding air bearings with the largest possible bearing base	The table is guided on a unique Leitz dovetail guideway, friction- and wear-free. The air bearings are maintenance-free.
Precision steel scale bars	The scale bars have the same expansion coefficients as most measured parts. Errors of measurement due to changes in temperature or faulty operation are also minimized.
High-resolution scale bars: up to 0.004 µm for the Leitz Infinity, all other models having 0.02 µm resolution	For the highest reproducibility of measurement results.
Integrated temperature sensors	Automatic compensation for temperature-conditional residual errors of the scale bars.
State-of-the-art electronic control	Controls complex movement sequences and evaluates the measurement data.
Remote diagnosis over the Internet	Servicing downtime kept short.
Full safety and collision protection system for the Leitz PMM-C, Ultra and Infinity: probe head, probe styli and quill are protected by sensors	In the event of a detected collision, the measuring sequence stops and a crash is avoided. This minimizes repair costs and maximises operating times.

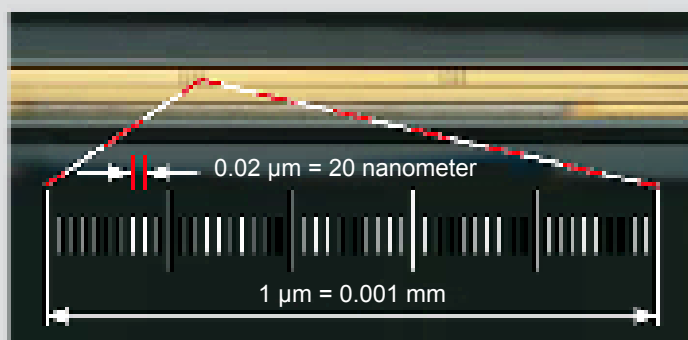




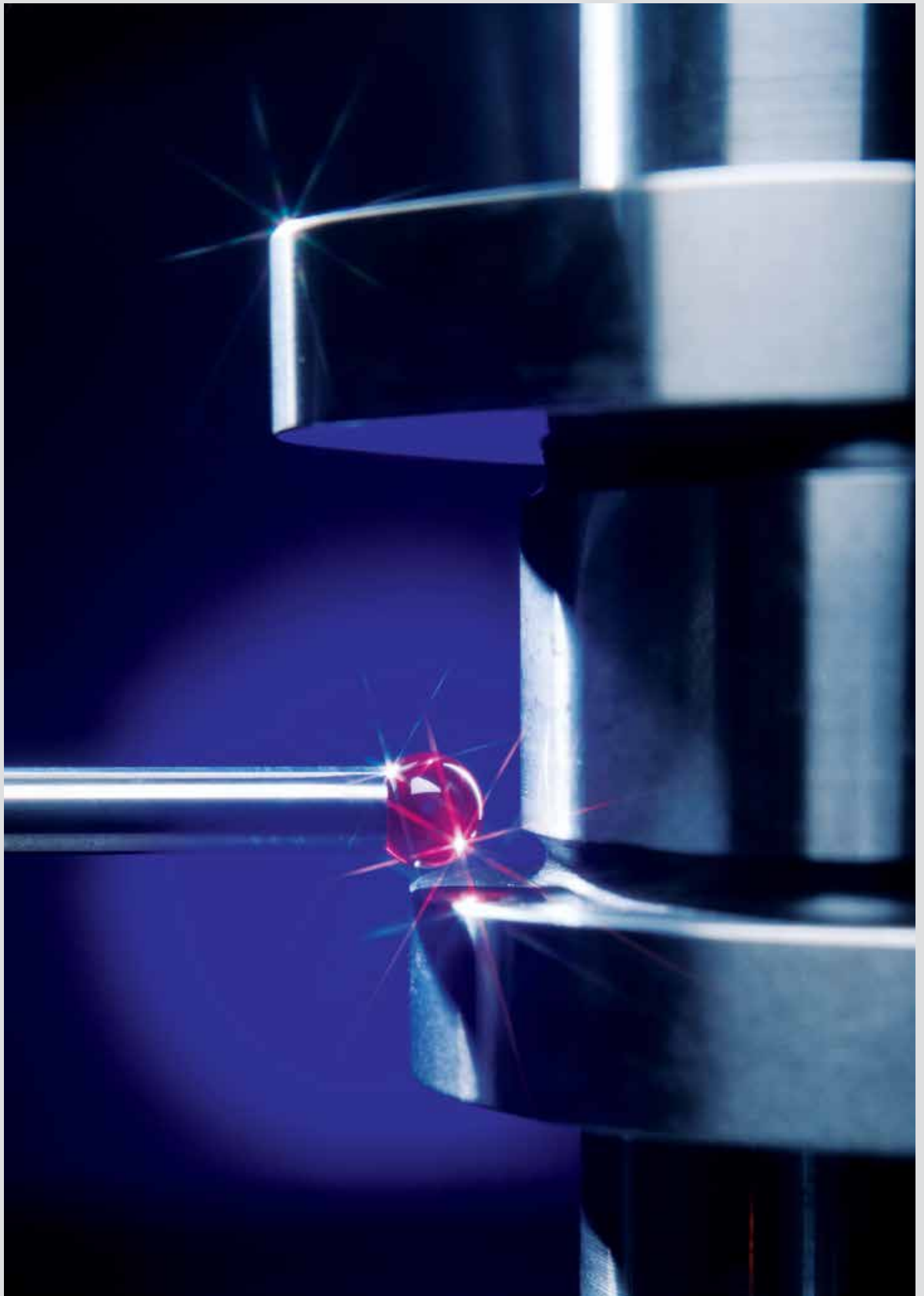
High performance and long-term stability thanks to its Closed Frame design. The load application points of the drive are positioned centrally with respect to the moving masses.



Pre-loaded air bearings on high-precision dovetail guideway. Support bearings with electronic monitoring of the gap widths.



The resolution of 0.02  $\mu\text{m}$  ensures the highest reproducibility, while the Leitz Inifinity boasts resolution down to 0.004  $\mu\text{m}$ .





# MEASURING IN HIGH-SPEED MODE

Exercise control of your processes and quality by using the various scanning methods of the Leitz PMM-C series. Scanning accelerates data acquisition, improves measuring throughput and supplies reliable data. All machine components, such as software, electronics and structural construction are designed for high speed.

## Measuring methods and applications:

### Variable High-Speed-Scanning

Variable High-Speed-Scanning ensures optimum speed based on part tolerances and geometry. The sensor measuring speed increases when moving over slight curvatures and straight lines. It automatically slows down on tight curvatures or tolerances. Helpful in the measurement of holes, turbines, gear teeth and stepping gears.

### Unknown contours and free-form surfaces

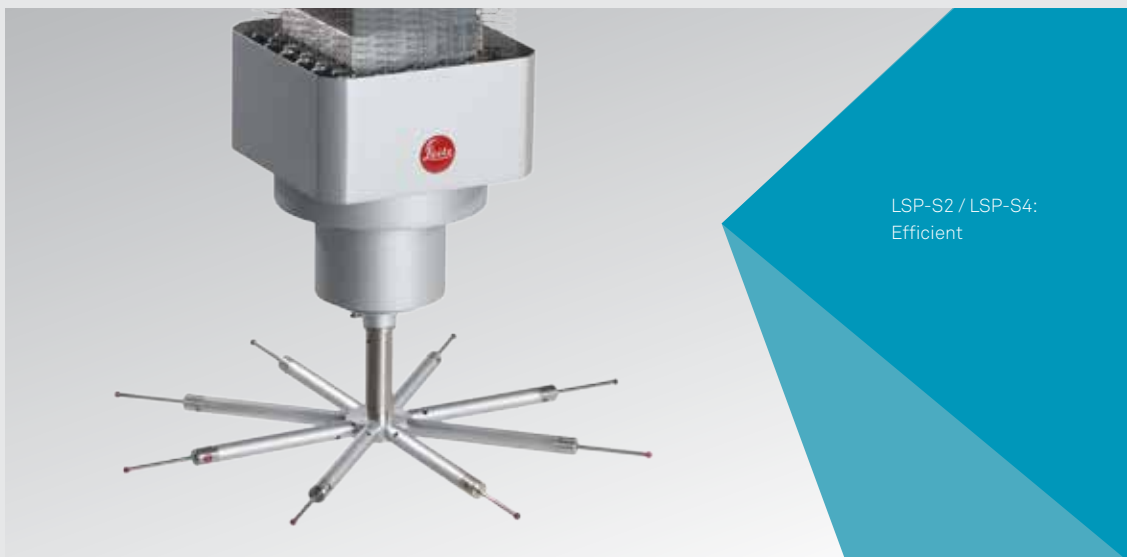
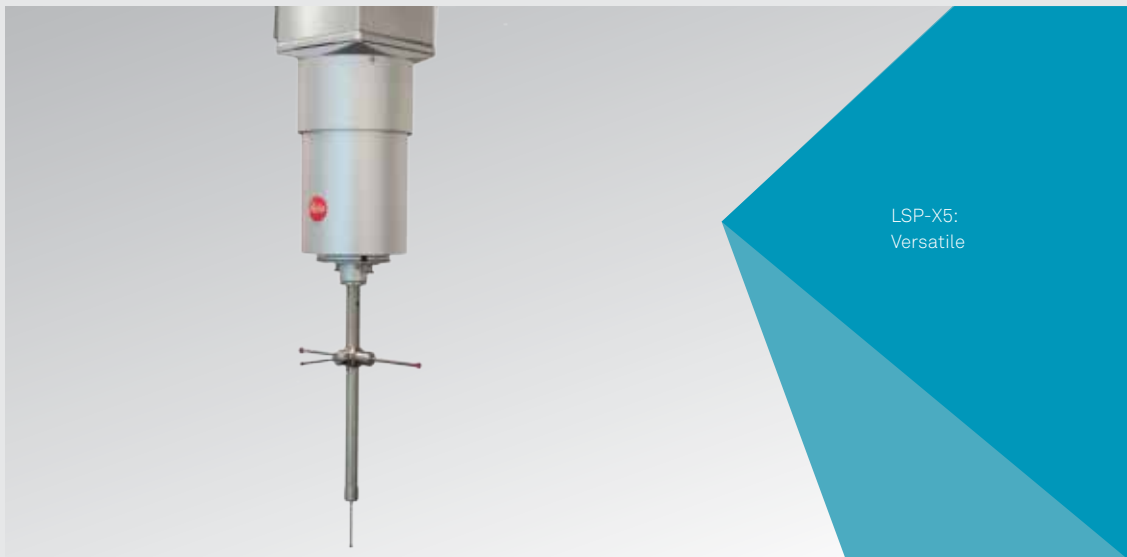
All Leitz PMM-C models are suitable for measuring the contours of parts for which no reference model is available. This measuring method is used for reverse engineering. Typical examples include the measuring of gear teeth, cams, bolts and compressors.

### Self-centering 3D scanning

Self-centering 3D scanning eases the task of measuring recesses and grooves. For accurate measurement results, the stylus ball is guided along the centre of the deepest part of the groove regardless of direction.

### Measuring with a rotary table

Most geometries can be measured by the Leitz PMM-C series without using a rotary table. However, a rotary table can be essential depending on the accessibility of certain features or if the number of probes required becomes impractical. The Leitz rotary tables developed by Hexagon Metrology integrate seamlessly into the Leitz PMM-C models, forming a single unit with the coordinate measuring machine. The complete system adjusts its dynamics to the position and weight of the part.



# TACTILE AND OPTICAL MEASUREMENTS

The series of tactile Leitz sensors have always been known for their dynamics and accuracy. They support single-point probing, self-centering 3D scanning and Variable High-Speed-Scanning.

The deflection is captured in high resolution. During the measurement process, the axes of the probe head are not clamped, so that the actual direction of the surface normals can be determined and used as the basis for the measurement. Leitz probe heads have no maintenance-intensive parts or active force generators.

The Leitz Precitec LR optical sensor is available for some models of the Leitz PMM-C series.

## **LSP-X5, LSP-S2, LSP-S4**

- Integrated automatic weight balancing
- High probing reproducibility from the large bearing base of the stylus receptacle
- Virtually maintenance-free probe head
- Automatic styli changing for higher throughput
- Collision protection
- Optional: part temperature sensor which can be utilised at any time during the measuring process
- LSP-X5: stylus assemblies up to 500 mm long and 500 g in weight, dovetail guide-ways for rapid installation
- LSP-S2/4: stylus assemblies up to 800 mm long in each direction and a total of 1000 g in weight, good for deep internal measurements
- LSP-S4: notable in addition for its low trigger force – ideal for measuring delicate surfaces
- $P_{FTU}$  values:
  - LSP-X5 = 0.6  $\mu\text{m}$
  - LSP-S2 = 0.5  $\mu\text{m}$
  - LSP-S4 = 0.4  $\mu\text{m}$

## **Leitz Precitec LR**

- High-precision optical sensor
- Non-contact measurement of transparent or delicate materials and reflective surfaces
- Automatic change between tactile and optical sensors during a measuring sequence





## THE WINDOW ON TO THE SYSTEM

Users have the choice of two software packages: PC-DMIS or QUINDOS. Both are known for their efficiency of programming and evaluation processes.

**PC-DMIS** acknowledged as the pioneer in CAD-based, computer-simulated programming. The software offers the ability to program with a simple graphical, intuitive user interface and can display results with a variety of reporting tools. PC-DMIS CAD++ is particularly suitable for measuring regular geometrical shapes and free-form surfaces.

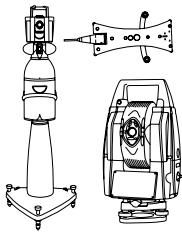
**QUINDOS** has over 50 options covering almost all industrial applications – from simple parts to special geometries. One strength of this software is its performance in the measurement of gear teeth and gear tooth cutting tools, e.g. straight and spiral bevel gears, worms, worm gears, step gears, screw compressors etc. All geometries can be displayed in 3D thanks to the integrated CAD core.

# SYSTEM ENGINEERING

By integrating a Leitz PMM-C coordinate measuring machine into your environment, you can be sure of reliable measurement results. We support you with a wide range of different products and services:

- Measuring rooms – constant temperatures promote reliable measurement results
- Measurement programs – our experts create programs for you and train your personnel
- Fixtures – for fast and reproducible measurement results
- Feeders – allow increased throughput and unattended measuring operations
- Network integration – for reliable connections to databases and CAD systems

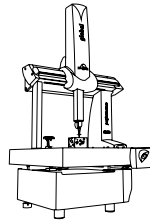




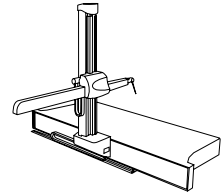
LASER TRACKERS  
& STATIONS



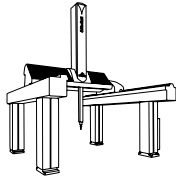
PORTABLE MEASURING ARMS



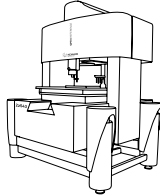
BRIDGE CMMs



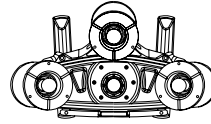
HORIZONTAL ARM CMMs



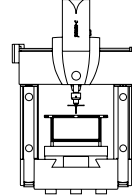
GANTRY CMMs



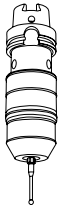
MULTISENSOR & OPTICAL SYSTEMS



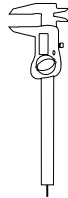
WHITE LIGHT SCANNERS



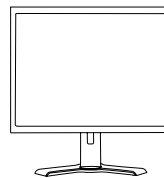
ULTRA HIGH ACCURACY CMMs



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](http://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](http://www.hexagon.com)

© 2013 Hexagon Metrology. Part of Hexagon

Due to continuing product development, Hexagon Metrology reserves the right to change product specifications without prior notice.

