



# Your Travel Guide to the World of Metrology

June 2011



**Cognitens**



po•dmis

**QUINDOS**

**ROMER**



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# **ROMER**



Portable measuring arms for research, development, production and assembly in their most mobile form – this is what **ROMER** stands for in the global Hexagon Metrology network. The portable measuring arms in which Romer specialises are produced in compliance with stringent quality and environmental standards. ROMER portable measuring arms permit tactile or optical and scanning 3D measurement. Stability, low weight and simple operation are their key advantages. ROMER. Metrology to go. **[www.romer.com](http://www.romer.com)**

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## **The ROMER Absolute Arm Absolutely Groundbreaking**

Portable measuring arms have fundamentally changed metrology. They make 3D measurement easy and fast. As a result, user productivity is heightened and measurement time is slashed. Where traditional measuring methods are impractical or impossible manufacturers, in more than 100 countries, rely on ROMER products to deliver the essential information quickly.

The **ROMER Absolute Arm** heralds a new era in this success story. ROMER produces a portable coordinate measuring machine which combines the entire experience of the Hexagon Metrology network.





ROMER measuring arms stand for maximum mobility in industrial metrology. Carbon fibre tubes ensure stability while maintaining the lowest possible weight. Fully integrated laser scanners make the ROMER Absolute Arm a top performing system for all metrology tasks. Absolute encoders, which assign an absolute value to each position of the arm, are used for the first time ever in a portable measuring arm. Initialisation is not necessary. Simply take the measuring arm to the part, switch it on and start measuring.

## **ROMER – Metrology to go**

### **ROMER Absolute Encoders**

A first in the world of portable measuring arms: The ROMER Absolute Arm features absolute encoders and is therefore the first measuring arm which does not require referencing before measurement. Absolute Encoders simplify the operation: When the arm is turned on, it's ready to go.



## ROMER Feature Packs

ROMER Feature Packs unfold the full potential of a portable measuring arm. These optional feature packs utilise the ROMER Feature Pack Port interface. All extensions are perfectly coordinated with the ROMER Absolute Arm and are part of an integrated system.

The ROMER Mobility Pack includes a battery and WiFi communication – maximum flexibility for the ROMER Absolute Arm.

The ROMER Scanning Pack is the interface for laser scanners. They connect directly to the arm. Feature packs are thermally and mechanically stable, easy to exchange for the user and open for new technologies and additional accessories.

### Infinite Rotation

ROMER's patented infinite rotation of the principal axes allows a comfortable inspection of hard-to-reach areas.

### Integrated Zero-G counterbalance

An optimized counterbalance reduces operator fatigue and delivers effortless control in all positions, including above and below the centreline.





## **ROMER Absolute Arm with integrated scanner**

The ROMER Absolute Arm is available with a fully integrated and certified laser scanner system with seven rotation axes. The laser scanner is tuned for a vast variety of materials without compromise in accuracy.

This low-weight laser scanner solution comes as a cost-efficient package. No additional cable or controller between the laser scanner and the portable measuring arm, permits the ROMER Absolute Arm's infinite rotation of the main movement axis. Thanks to the perfect balance, the ROMER Absolute Arm with the integrated scanner, can be operated with one hand.





### **ROMER Absolute Arm with external scanner.**

The ROMER Absolute Arm with external scanner is designed for the high performance laser scanner CMS 108 from Hexagon Metrology. Third party scanners can also be connected.

The ROMER Absolute Arm with external scanner is a premium portable CMM for uncompromising scanning requirements.





### **CMS 108 laser scanner for ROMER Absolute Arm**

With CMS 108, the ROMER Absolute Arm offers first-class performance even on complex surfaces and on work pieces made up of the most challenging material types. Teaching of the material is not required because the automatic laser power control of the CMS 108 automatically adapts to the surface conditions. CMS 108 is the first ever laser scanner with a zoom function – providing three different line widths.

ROMER Absolute Arm with external scanner:

- Designed for Hexagon Metrology CMS 108 high performance scanner
- Elaborated system design – no external cable around the arm
- TESA connector for CMS 108 – easily changeable, only one calibration
- Open platform for future integrations thanks to TESA connector and Feature Pack technology



### ROMER Tube Inspection System

The quick non-contact measurement solution for the inspection of bent tubes in your work shop. **ROMER Arm Tube** is the ideal solution especially designed for tube shop and mainly in automotive, aerospace, furniture, air conditioning and subcontracting industries.

The latest technology in non-contact measurement:

- Non contact infrared and laser technology
- No tube deflection during measurement
- Simple and double precision measurement
- Works with 180° bend angles
- Option to move tubes during measurement
- Automatic bender adjustment through network or serial link
- Cost effective solution: no more expensive masters needed
- Minimum down time for new tubes in production





**ROMER Multi Gage** is the easy-to-handle portable CMM, with its innovative design and ROMER-exclusive features such as counter-weight, WiFi, plug-and-measure probes, and intuitive Multi Gage software make it the must-have 3D measurement tool for improving your productivity.



Designed exclusively for today's machine shop, the six-axis ROMER Multi Gage is a portable precision CMM with a 1.2 m measuring volume. The ROMER Multi Gage is used for dimensional control of molds, parts, tooling, castings, and more. Its quickmount system allows the CMM to be setup for on-demand measurement and inspection of parts or assemblies on your machine tool or anywhere on the shop floor.







PC-DMIS 3D inspection and measurement

## PC-DMIS® Portable

Bringing metrology to the shop floor, portable measurement arms are rapidly changing the way manufacturers use metrology. With them, it is possible to perform more measurements and do more analysis on the shop floor where they have the potential to do the most good. They make it easy to monitor manufacturing operations and correct problems before they result in increased scrap and unnecessary reworks. To take full advantage of portable measurement machines requires software to match their unique capabilities. PC-DMIS Portable does just that. It is a precise adaptation of PC-DMIS for CMM. Without compromising on usefulness, it makes it easy for shop floor personnel to measure parts with minimal training and maximum effectiveness.

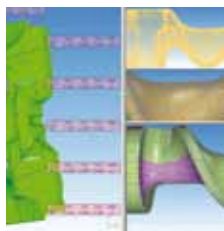
PC-DMIS Portable offers a range of innovative features:

- Quick Start GUI – Programmers and operators can make full use of their machine's most frequently used capabilities without being overwhelmed with detail.
- Any-order Measure™ – This powerful innovation lets operators probe parts in the most convenient and efficient order.
- Aligning contoured parts – PC-DMIS Portable makes short work of aligning the most complex parts. The optional CAD++ configuration includes a range of algorithms for best fit and iterative alignments.



- Arm as mouse mode – With the click of a button, operators can use the arm as a pointing device to choose menu items and select geometry.
- Sheetmetal Measurements – PC-DMIS Portable offers an optional library of sheetmetal measurement routines designed to meet the requirements of manufacturers of automotive parts.
- Cues for Measurement – Besides prompting users with text and graphics, the software provides a combination of dynamic audio and visual cues to guide them through the measurement process.
- Sharing Training – Because all EMS measurement products share a common look and feel, greatly reducing the need for costly cross-training and specialization.

**PC-DMIS Reshaper** software is a reverse engineering package able to generate surfaces and sections from digitized point clouds. Thanks to efficient and fast surface calculation, reverse engineering times can be dramatically improved. PC-DMIS Reshaper application for ROMER Portable Measuring Arms & Scanners: a complete 3D point-cloud processing software for users who need to handle rapidly generated point clouds files and obtain high-quality 3D meshes at an affordable price.



PC-DMIS Reshaper Reverse engineering software



Geometric measurement software

**ROMER G-Pad** Geometric measurement software is the basic, user-friendly geometric measurement package for the ROMER arms. An efficient and quick menu access makes G-Pad easy and intuitive to use. In addition to the basic interface, the package offers advanced inspection functions, automatic and guided measurement procedures and data export.



Non-contact tube measurement software

**ROMER G-Tube** is the latest technology in non-contact tube measurement: automatic tube-bending machine adjustment is included, as well as spring-back calculation and customized interfaces to the most common pipe-bending machines. G-Tube reduces bending machine setup times and tube manufacturing costs.

Non-contact tube measurement software

**ROMER DOCS Tube Inspection** is the premier CAD-based tube inspection software. Designed to revolutionize quality control in the tubing industry, DOCS stands for Data Overlay Camera System and is compatible with ROMER portable measuring arms. ROMER DOCS can inspect and measure round metallic and non-metallic wire, tubing, and piping used in almost any industry – automotive, aerospace, shipbuilding, medical, machinery, appliance, and more. DOCS can also produce corrected bend data for CNC tube benders.





**PowerINSPECT** – 3D Geometric measurement & surface inspection software is the reference for higher quality, higher efficiency during the production process. Geometric control and complex 3D parts inspection with CAD files. Standard PowerINSPECT applications: mouldings, prototypes, tools and models.



**PolyWorks** – The leading software solution for high-end point cloud inspection and reverse engineering applications. Whether you are casting, milling, molding or stamping, you can rely on PolyWorks to provide a complete solution for your process. The PolyWorks software suite is available as a complete package or – with regard to the two main applications – as a point cloud inspection or reverse engineering package.





**Leica Geosystems (Metrology Products)** is a global supplier of comprehensive hardware and software packages to the industrial metrology market. These products integrate with popular CAD programs, various build-and-inspect tools and reverse-engineering software. Using state-of-the-art laser technology, Leica Geosystems' industrial measurement products make quality control, part mating, assembly, and construction of large and small parts easier and more accurate than ever.

**[www.leica-geosystems.com/metrology](http://www.leica-geosystems.com/metrology)**

## **Portable measuring systems**

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22	Leica Absolute Tracker AT901
28	Leica TM6100A Industrial Theodolite
29	Leica TDRA6000 Industrial Laser Station
	Sensors (contact and non-contact)
26	Leica T-Probe
	Leica T-Scan
27	Leica T-Mac
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	Software
30	PC-DMIS Portable
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The **Leica Absolute Tracker AT401** is a portable coordinate measuring machine (CMM) that allows extreme precision over ultra large distances. It is able to be powered by its own internal battery and is able to work in the most demanding environment, yet maintains the highest level of precision and the largest ever work envelope. The Leica Absolute Tracker AT401 has a unique "All in One" system design that incorporates such needed accessories as built in live video, level to gravity, environmental monitoring and even an integrated IR remote control. By utilizing the integrated Wireless LAN communication the sensor can be used completely wirelessly making this the most portable Absolute Tracker ever.

Especially large structures require highly accurate, flexible and portable metrology equipment. This surrounding is right for the Leica Absolute Tracker AT401. It redefines large scale portable measurement and opens the door for unprecedented metrology applications.





### **A new level of portability & durability.**

The complete measurement system weighs less than 15 kg including the case and in a minimum configuration it will fit into the overhead compartment of most commercial airliners. This is truly the world's most portable CMM.



### **Ready for any environment**

Utilizing a completely sealed design that is independently IP54 (IEC 60529) certified means this sensor can be installed in the most unforgiving environments. Spraying coolant, dust, weld splash, nothing is too harsh for this sensor. The Leica Absolute Tracker AT401 is the first laser tracker certified for outdoor use, even in the rain.



**PowerLock** – This vision technology detects a reflector and automatically locks the laser beam onto it, even when the target is moving. The laser beam moves to the user, not the other way around.







An **Absolute Tracker AT901** from Leica Geosystems is a portable measurement system that relies on a laser beam to accurately measure and inspect in a spherical volume of up to 160 m (525 ft). The Leica Absolute Tracker can gather 3D coordinates in 4 ways: by following a small mirrored sphere, also known as a reflector; by tracking a Leica T-Probe, a hand-held "Walk-Around" wireless contact probe; by tracking a Leica T-Scan, a contactless high-speed laser scanner; or by tracking a 6DOF device for automated applications such as with machines or robots. Which measurement method you should use will depend on your application.

The Leica Absolute Tracker AT901 is equipped with PowerLock: For the first time in the history of laser trackers, the laser beam moves to the user, not the other way around.



### **Leica Absolute Tracker AT901-Basic**

If your application requires positioning machines, fixtures or jigs, or if you are in the business of installing and aligning machine tools, roll mills, presses or gantry based machines, the Leica AT901-Basic is your tracker. Operating solely with a reflector, it is optimized for inspections within a typical measurement volume of up to 160 m (525 ft), and comes standard with our Leica Absolute Interferometer and PowerLock technologies.





### **Leica Absolute Tracker AT901-Mid Range**

Since the introduction of the Leica T-Products in 2004, practically all leading automobile manufacturers have joined the ranks of our customers. When a reflector simply won't cut it because there is no clear line of sight to the part you are trying to inspect, the part is hidden or sunken deep beneath surrounding sheetmetal, or because you need to reverse-engineer a part right there on the spot, the Leica AT901-MR is all you will need. When coupled to the Leica T-Scan, T-Probe, or T-Mac the Leica AT901-MR gives you a measurement volume of up to 18 m (59 ft). Of course, it can also be used with a standard corner cube, in which case its measurement volume goes up to a full 50 m (164 ft). The sensor is designed for large vehicle size objects and of course comes standard with our Leica Absolute Interferometer and PowerLock technologies.





### **Leica Absolute Tracker AT901-Long Range**

This is the laser tracker that set the new benchmark for aerospace and other large scale precision measurements such as windmill blade inspection or industrial machinery alignment. It gives you hand-held wireless probing (Leica T-Probe), hand-held contactless scanning (Leica T-Scan), and full machine control abilities (Leica T-Mac) in a volume of up to 30 m (98 ft). Of course, it can also be used with a standard corner cube, in which case its typical measurement volume goes past 160 m (525 ft). This is the laser tracker that set new standards for usability with the Leica Absolute Interferometer and PowerLock, and continues to be the best selling 6DoF laser tracker in the world.





**Leica T-Probe** – Leica T-Probe, the "Walk-Around" armless wireless device for probing of hidden, hard-to-reach points and measuring of up to 9 cars in one setup with minimal setup times, sets new standards by increasing accuracy, offering a ten-fold increase in point acquisition rate and providing user-assignable multi-function buttons. It is small, light, user-friendly, and more accurate than any other hand-held probe in the world.



**Leica T-Scan** – Leica T-Scan TS50 is a high-speed hand scanner for large-volume portable applications. This third-generation Leica T-Scan is more accurate, provides a better performance on challenging material types and offers double the point acquisition rate compared to the previous generation. The Leica T-Scan is more than just a line scanner. Its Flying Dot technology is the only truly automated scanning solution. The adjustment of the laser power to obtain the best measurement result of a specific surface type is completely autonomous. This ensures the best possible results – independent from the operator. Leica T-Scan scans large objects more accurately and 50 percent faster than comparable products.





**Leica T-Mac** – Leica T-Mac (Tracker-Machine control sensor), the next-generation 6DoF tracking device for automated applications, answers the needs of a growing number of Leica Geosystems customers who have either modified the existing Leica T-Probe for automated measurement applications or have expressed interest in doing so. Leica T-Mac is an off-the-shelf solution that can be custom-tailored to the needs of a specific application. For example, when needed, an interface for precise tool exchange units can be included. Operating specifications and accuracy information, including the maximum range of 30 m (98ft) correspond to those of Leica T-Probe.



**Leica Automated Solutions** – The Leica Absolute Tracker AT901 turns an ordinary robot into an incredibly accurate metrology device. Leica Automated Solutions are capable to control and inspect large-volume work pieces.





Leica Geosystems' Laser Stations and Industrial Theodolites are known around the world for being the most accurate and easiest to use. With advanced features like Piezo direct drives, color touch screen display and an intuitive user interface, the TPS6000 family takes industrial measurement to a whole new level.

The **Leica TM6100A** is the world's most accurate theodolite with the highest angular accuracy, panfocal telescope and autocollimation device. With unrivalled precision and superb optics, the Leica TM6100A has become the standard instrument of choice in the aerospace industry for satellite alignment as well as for system and Heads Up Display alignment for combat aircraft. When the need arises, the system can be expanded to a multi-instrument system.

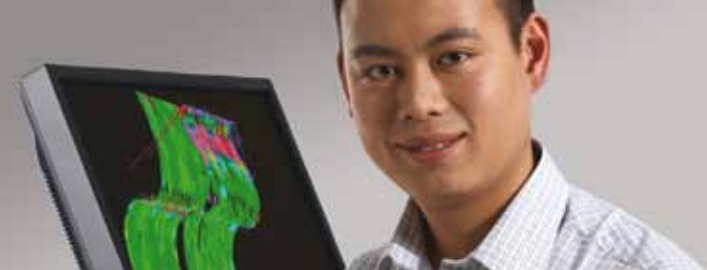




The **Leica TDRA6000** is the most accurate laser station ever designed for industrial use. It has the ability to automatically target both CCR and tape targets and can even measure without targets maintaining a typical reflectorless accuracy of 1 mm. Optimized for use within 300 meters and combined with the Leica Geosystems PowerSearch module, the new Leica TDRA6000's tracking performance is simply unbeatable.





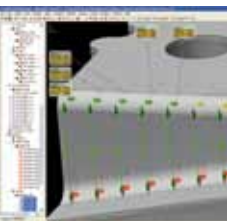


**PC-DMIS Portable** supports the complete Leica Laser Tracker family including Leica T-Probe. The package enables existing PC-DMIS user to utilize one common SW platform across all their CMM's and portable sensors. The state of the art tracker interface supports your most demanding measurement tasks. While you do your measurement job, PC-DMIS Portable is automatically creating a program for repetitive tasks.

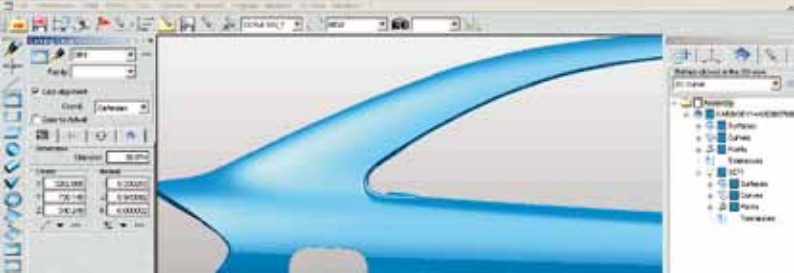


emScon – Laser Tracker programming interface

The new update of **emScon** enables you to control your Leica Geosystems Laser Trackers with any software platform as well as with a web browser, giving you a perfect integration of the laser tracker with the software you are used to. Providing unparalleled flexibility and with a straight-forward interface design, emScon enhances the profitability of using Leica Geosystems Laser Trackers for coordinate measuring, automation, robot calibration and machine guidance tasks.



Whether you are casting, milling, molding or stamping, you can rely on **PolyWorks** to provide a complete solution for your process. The PolyWorks software suite is available as a complete package or – with regard to the two main applications – as a point cloud inspection or reverse engineering package. Use high-density point clouds of digitized



prototype parts & assemblies to quickly identify deformations and to fix problems in the earlier stage of the manufacturing process or approve your manufacturing process by fully inspecting your first-assembled products.

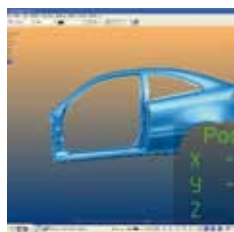
**Metrolog XG for Leica** interfaces with the Leica Geosystems PCMM solutions such as the Laser Tracker and the "Walk-Around" Leica T-Probe. The graphical visualization provides direct interfaces for virtual any neutral and native CAD format.

A powerful feature based measurement tool, a complete GD&T engine, the customizable reporting and a simple, fast programming language all support and simplify your sophisticated assembly and inspection processes.



Metrolog XG for Leica  
– Global 3D inspection  
software

**Microlog XG** is a custom-made software package for cost-sensitive sensors and Leica Geosystems Total Stations, 3D laser trackers or articulated arms. The software features all the tools required for standard inspection – from importing Reference data to report creation. Microlog XG's user interface is just as simple and intuitive as that of Metrolog XG for Leica.



# Cognitens

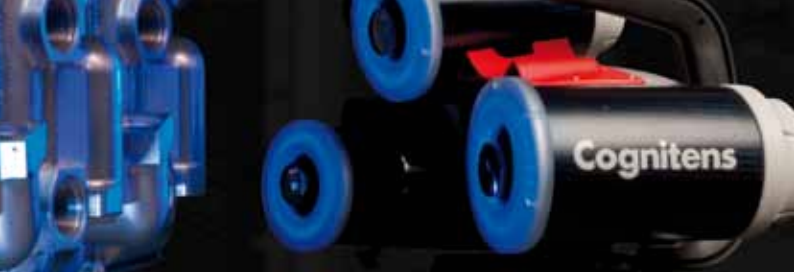


**Cognitens** is the leading provider of comprehensive Dimensional Measurement Solutions, focused on improving engineering and manufacturing processes in automotive and other manufacturing industries. Dimensional Measurement is an increasingly significant strategy which allows manufacturing organizations to accelerate product introductions, reach higher product quality, reduce production costs and bring about higher profits for each product.

**[www.cognitens.com](http://www.cognitens.com)**

## **White light scanners**

34	Cognitens WLS400M
35	Cognitens WLS400A
	Software
37	CoreView Plan
	CoreView Pro
	CoreView Master Part
	CoreView Lite
	CoreView Teach / AM
38	CoreView Analysis
117	Service
118	Contacts



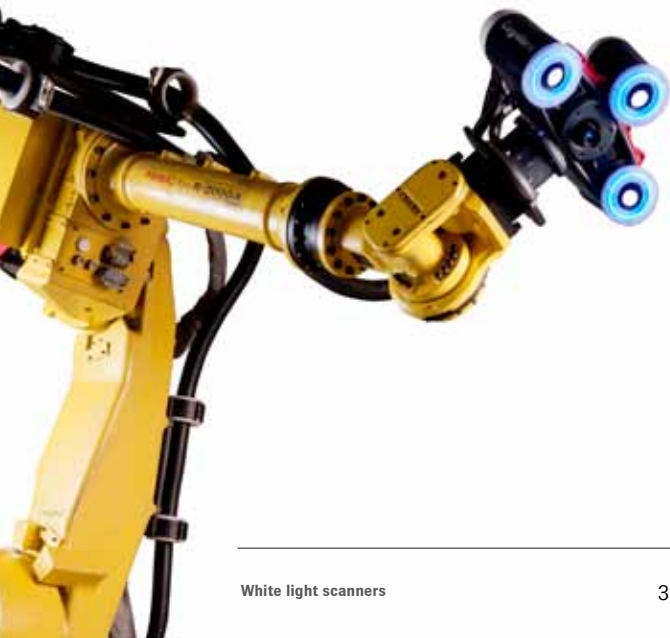
The **Cognitens WLS400** is the next generation of Hexagon Metrology White Light sensors featuring the latest technologies including high-resolution digital cameras, LED-based illumination, carbon fibre structure, and rapid data-acquisition and processing.

The **Cognitens WLS400M** white light scanner is a manually operated system used for 3D metrology, quality inspection and digitizing. The system features unique measurement capabilities which emphasize its value for multiple industrial applications.





**Cognitens WLS400A** for quality iterations during tryout, production ramp up, quality assurance and dimensional process control. The white light measuring system Cognitens WLS400A is a flexible solution for real-time shop floor metrology. It acquires rich dimensional information from measured objects regardless of size, complexity or geometric features. Cognitens WLS400A is designed to ensure highly reliable measurements without compromising on measurement throughput, flexibility and ease of use critical for recurring operations.





The Cognitens Dimensional Measurement Software Suite is comprised of various added value software products which enhance the benefits generated by using Cognitens WLS400M and WLS400A dimensional measurement platforms. This software suite along with innovative business processes, allow manufacturers to migrate from traditional methods of costly checking fixtures and other technologies to flexible non-contact dimensional gauging.

Our Dimensional Measurement Software Suite offers numerous Advantages and benefits which allow companies to better leverage our platforms and generate higher returns:

- Improves the utilization and throughput of WLS400M and WLS400A platforms
- Supports a distributed working environment including multiple sites
- Accelerates the learning curve for new users
- Enables effortless definition of measurement programs from remote locations
- Provides comprehensive reporting, customization and distribution of measurement information
- Allows you to pinpoint cause and effect of complex engineering problems
- Helps streamline complicated processes such as part approval for production
- Manages dimensional information from across the organization and making it available for end users in real time



## **Our software products offerings**

The Dimensional Measurement Software Suite includes the following products:

### **CoreView Plan**

Dedicated software tool used for accelerating tasks of planning, defining and preparing comprehensive dimensional measurement programs for Cognitens systems.



### **CoreView Pro**

Powerful software offering easy-to-use tools for dimensional measurement analysis, reporting and collaboration.

### **CoreView Master Part**

Unique software tool that allows generating virtual master part benchmarks from multiple measurement results. Used for conducting future comparisons vs. actual dimensional conditions and driving focused quality efforts using functional build methodology.

### **CoreView Lite**

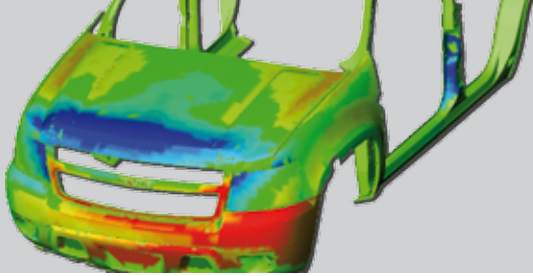
Free results viewer for cross company / supply chain collaboration and quality improvements.

### **CoreView Teach / AM**

The software that operates the Cognitens WLS400A system from programming a new part through approval for automated measurement to recurring 3D inspections runs by shop floor / quality operators.







### **CoreView Analysis**

Allows offline analysis, report generation, virtual assembly studies and more based of a full dimensional data set which Cognitens white light systems generate.





Since 1963, **DEA** has been one of the world's premier brands in Coordinate Measuring Machine technology. The main facilities are located in the Torino area, Italy, where highly skilled teams of mechanical, electronic and software engineers are committed to the continuous development of state-of-the-art solutions for dimensional quality inspection. DEA products are used by virtually every industry in every geographical market throughout the world. **[www.dea.it](http://www.dea.it)**

## **Coordinate measuring systems**

	Bridge CMMs
42	DEA Micro-Hite 3D
43	DEA Micro-Hite DCC
44	DEA ONE
45	DEA PIONEER
46	DEA DISCOVERY
47	DEA MICRA
48	DEA GLOBAL Silver Classic
49	DEA GLOBAL Silver Performance
50	DEA GLOBAL Silver Advantage
51	DEA GLOBAL Silver SF
52	DEA GLOBAL eXtra
	Gantry CMMs
53	DEA ALPHA
54	DEA DELTA SLANT
55	DEA LAMBDA SP
	Horizontal arm CMMs
56	DEA TORO
57	DEA MERCURY
58	DEA BRAVO Console
59	DEA BRAVO HD
60	DEA BRAVO HP
61	DEA BRAVO HA
62	Flexible fixturing systems
	Probing Technology
70	Leitz
82	Hexagon Metrology
88	TESA
	Software
110	PC-DMIS
115	Surfer EVO
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3D Model

DEA Micro-Hite, the line of small CMMs featuring excellent performance, is the result of the synergy among Hexagon Metrology companies in research, design and manufacturing. That's why Micro-Hite boasts the best price/performance ratio in the market.

The manual version, **DEA Micro-Hite 3D**, is ergonomic and easy to use: it is therefore the ideal replacement of hand tools and gages.

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Measuring Range (mm)  
from 460 x 510 x 420 to 460 x 710 x 420

ISO 10360 Performance Specs ( $\mu\text{m}$ )  
 $\text{MPE}_E = \text{from } 3.0 + 4.0 \text{ L}/1000$





DCC Model

The automatic version, **DEA Micro-Hite DCC**, features performance and flexibility typical of larger measuring volume CMMs.

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Measuring Range (mm)  
from 460 x 490 x 390 to 460 x 690 x 390

ISO 10360 Performance Specs ( $\mu\text{m}$ )  
 $\text{MPE}_E = 2.5 + 3.9 \text{ L}/1000$





Model 07.07.05



Model 07.10.07

The **DEA ONE** coordinate measuring machine (CMM) is designed to work in the production environment. It is characterised by an innovative design that incorporates new technology and advanced materials. Its steel guideways and linear recirculating ball bearings eliminate the need for compressed air supply, so that it can be placed close to where you need it, to verify your production processes and product quality. DEA ONE can be optionally equipped with analog probes for feature and free form scanning.

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Measuring Range (mm)

from 700 x 700 x 500 to 700 x 1000 x 650

ISO 10360 Performance Specs (µm)

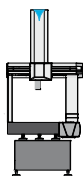
$MPE_E = \text{from } 3.9 + 4.0 L/1000$

$MPE_{THP/T} = \text{from } 6.5 \mu\text{m}/85 \text{ s}$

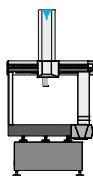




Model 05.06.04



Series 06.xx.06



Series 08.xx.06

**DEA PIONEER** is the perfect fit for manufacturers purchasing their first coordinate measuring machine (CMM), and for large manufacturing operations needing multiple CMMs with maximum price-to-performance ratio.

DEA PIONEER CMMs are used in quality inspection for first and final part acceptance, fixture qualification and process control. DEA PIONEER is the ideal measurement system for handling a variety of dimensional inspection tasks on general mechanic and prismatic components. You can tailor your DEA PIONEER CMM with a complete range of Swiss-made TESASTAR touch probes, probe heads and probe accessories.

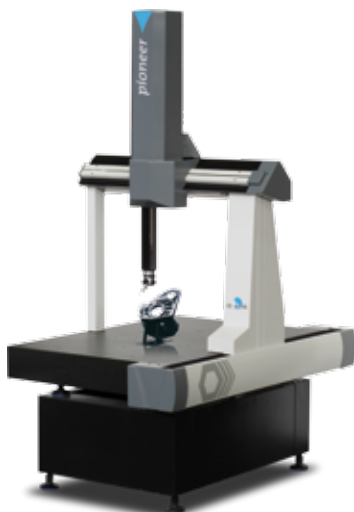
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**Measuring Range (mm)**

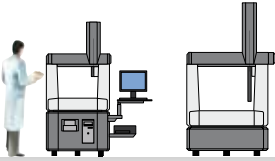
from 500 x 600 x 400 to 800 x 1200 x 600

**ISO 10360 Performance Specs (µm)**

$MPE_E = \text{from } 2.8 + 3.5 L/1000$







Model D-8  
D-12

Model D-28

The **DEA DISCOVERY** stands up to the harsh environment of machine shops and manufacturing cells with advanced geometric thermal compensation, built-in vibration resistance and shop-hardened design. Operators can begin inspecting parts with relatively little training. A roll-around stand lets users easily move the DEA DISCOVERY anywhere in the shop where precise dimensional inspection is required.

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Measuring Range (mm)

from 508 x 609 x 406 to 762 x 1016 x 609

ISO 10360 Performance Specs (µm)

$MPE_E = 3.9 + 4.0 L/1000$

$MPE_{THP/T} = 6.5 \mu\text{m}/85 \text{ s}$





Model 04.05.03

The **DEA MICRA** coordinate measuring machine (CMM) is naturally predisposed for quality inspection of small high-precision parts. It unites high accuracy and exact single-point inspection with accurate scanning of surfaces and profiles. The miniaturized LSP-X1 high-tech scanning probe system provides DEA MICRA's foundation. With this high-accuracy 3D probing system, the DEA MICRA provides both single-point inspection and surface scanning as standard features.

---

Measuring Range (mm)  
400 x 500 x 300

**ISO 10360 Performance Specs ( $\mu\text{m}$ )**

$\text{MPE}_E = 1.0 + 2.5 L/1000$

$\text{MPE}_{HP/T} = 2.0 \mu\text{m}/68 \text{ s}$





Series 05.xx.05



Series 07.xx.05



Model 07.10.07



Series 09.xx.08



The **DEA GLOBAL Silver Classic** is an affordable all purpose CMM for the dimensional inspection. The machine can be equipped with touch trigger probes or scanning probes. DEA GLOBAL Silver Classic CMMs are used in a number of industries for first and final part inspection, fixture qualification and process control. DEA GLOBAL Silver Classic is the ideal measurement system for handling a wide variety of dimensional inspection tasks on general mechanic and prismatic components with good accuracy and productivity.

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Measuring Range (mm)

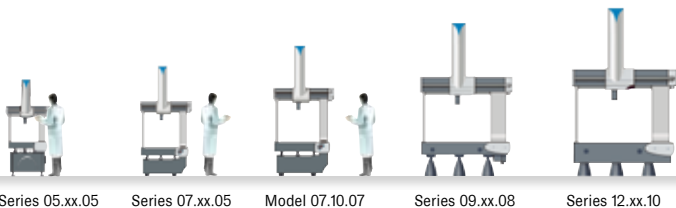
from 500 x 500 x 500 to 900 x 2000 x 800

ISO 10360 Performance Specs ( $\mu\text{m}$ )

$\text{MPE}_E = \text{from } 1.9 + 3.3 \text{ L}/1000$

$\text{MPE}_{\text{TPR/T}} = \text{from } 3.5 \mu\text{m}/68 \text{ s}$





**DEA GLOBAL Silver Performance** brings affordability to multi-sensor technology. It is the best tool for the user who needs to perform a wide variety of metrology operations on a single, flexible and accurate CMM. With its new capabilities, DEA GLOBAL Silver Performance provides a scanning throughput improvement of up to 35% in comparison to the previous generation of DEA GLOBAL...

Benefit from multi-sensor technology: single-point measurement, continuous scanning, non-contact probes... everything in one system. CLIMA structural thermal compensation allows optimum CMM accuracy in a wider temperature range (16 - 26 °C).




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Measuring Range (mm)

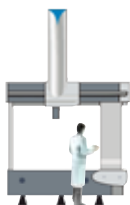
from 500 x 500 x 500 to 1200 x 3000 x 1000

ISO 10360 Performance Specs (µm)

$MPE_E = \text{from } 1.5 + 3.0 L/1000$

$MPE_{THP/T} = \text{from } 2.9 \mu\text{m}/45 \text{ s}$

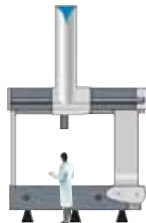




Series 15.xx.14



Series 20.xx.15



Series 20.xx.18



**DEA GLOBAL Silver Advantage** are fast and accurate CMMs that can handle any measurement and inspection task quickly and efficiently. The new DEA GLOBAL Silver Advantage provides a scanning throughput gain of up to 35% in comparison to the previous generation of DEA GLOBAL. The outstanding dynamics and first-class accuracy make DEA GLOBAL Silver Advantage the ideal tool to keep manufacturing process under close and permanent control. Standard on all DEA GLOBAL Silver Advantage models, CLIMA structural thermal compensation allows first-rate measuring accuracy even in non ideal temperature conditions (16 - 26 °C).

---

Measuring Range (mm)

from 500 x 700 x 500 to 2000 x 4000 x 1800

ISO 10360 Performance Specs (µm)

$MPE_E = \text{from } 1.4 + 3.0 L/1000$

$MPE_{THP/T} = \text{from } 2.5 \mu\text{m}/45 \text{ s}$





Series 07.xx.05

Series 09.xx.08

Series 12.xx.10

For enhanced productivity on the shop floor. The **DEA GLOBAL Silver SF** ensures most accurate results in a temperature range of 15 to 30 °C. A network of thermal sensors detects the temperature on the CMM frame and on the workpiece. Advanced structural thermal compensation algorithms perform real-time compensation of temperature-induced deformations of the machine and the part. CTE-certified optical scales minimize measuring errors and contribute to first class metrology performance also in typical shop floor environments. The DEA GLOBAL Silver SF provides extra protection against dirt and dust by means of bellows and guards on the X and Y axes.




---

Measuring Range (mm)

from 700 x 700 x 500 to 1200 x 3000 x 1000

ISO 10360 Performance Specs (µm)

$MPE_E = \text{from } 1.4 + 3,0 \text{ L}/1000$

$MPE_{THP/T} = \text{from } 2.5 \text{ µm} / 45 \text{ s}$





Series 20.xx.15 (eXtra)  
Series 20.xx.18 (eXtra)

**DEA GLOBAL eXtra** can accommodate large and heavy workpieces without the need for special foundations. The DEA GLOBAL eXtra, designed for measurement in the production environment, features ACTIV® structural thermal compensation, protection bellows on X and Y guideways and operating temperatures up to 30°C. For unlimited access to hard-to-reach features, these larger size DEA GLOBALs can be equipped with the DEA exclusive CW43L-mw servo wrist.

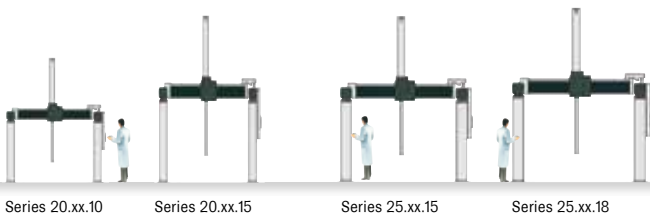



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Measuring Range (mm)  
from 2000 x 3300 x 1500 to 2000 x 4000 x 1800

ISO 10360 Performance Specs (µm)  
MPE<sub>E</sub> = from 12 + 18 L/1000





**DEA ALPHA** is an innovative product line of cost-effective medium-capacity CMMs, which combine high throughput and high accuracy with excellent operating reliability and reduced maintenance. It is the ideal system for die and mold manufacturing support.



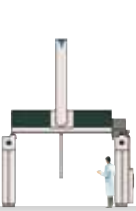

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Measuring Range (mm)  
from 2000 x 3300 x 1000 to 2500 x 5000 x 1800

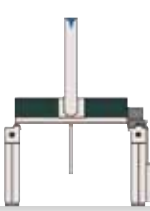
ISO 10360 Performance Specs ( $\mu\text{m}$ )  
 $\text{MPE}_E = \text{from } 4.0 + 4.0 \text{ L}/1000$   
 $\text{MPE}_{\text{THP/T}} = \text{from } 6 \mu\text{m}/120 \text{ s}$







Series 20.xx.15  
20.xx.20



Series 25.xx.15  
25.xx.20



Series 30.xx.20  
30.xx.25



**DEA DELTA SLANT** is a range of gantry CMMs that excels in the high-accuracy inspection of large machined parts due to its superior mechanical structure.

DEA DELTA SLANT comes in two versions: Classic and Performance. The option "SF-Kit" is available for the installation of both Classic and Performance models in workshop environment.

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Measuring Range (mm)

from 2000 x 3300 x 1500 to 3000 x 8000 x 2500

ISO 10360 Performance Specs (µm)

$MPE_E = \text{from } 4.0 + 3.8 L/1000$

$MPE_{THP/T} = \text{from } 4.5 \mu\text{m}/100 \text{ s}$





Series from 40.xx.25 to 60.xx.40

**DEA LAMBDA SP** is the largest CMM line on the market. DEA LAMBDA SP excels in high-speed, high-accuracy inspection of huge components, such as marine engines, aircraft structures, nuclear vessels, or turbines that require open, modular, easily customizable structures with virtually unlimited measuring volumes.

---

Measuring Range (mm)  
from 4000 x 5100 x 2500 to 6000 x 10000 x 4000

ISO 10360 Performance Specs (µm)  
 $MPE_E = \text{from } 5.5 + 6.0 L/1000$   
 $MPE_{THP/T} = \text{from } 6.0 \mu\text{m}/120 \text{ s}$





Series xx.16.21  
Series xx.16.25



**DEA TORO** is an innovative line of automatic horizontal-arm measuring machines for dimensional inspection of sheet metal components and large size parts.

DEA TORO features an extraordinary price/performance ratio and is available in the Runway structure with main guideway fixed to the floor.

The machine is supplied with a temperature sensor based linear thermal compensation. The DEA TORO systems are available in single and dual arm configuration.

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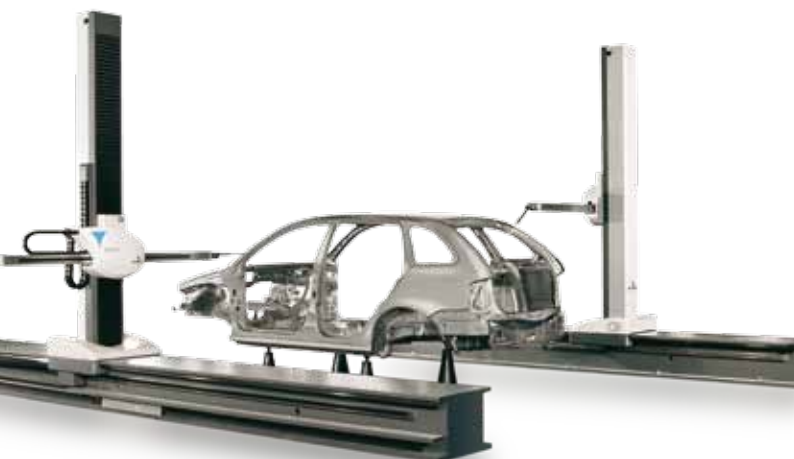
Measuring Range (mm)

from 4000 x 1600 x 2100 (single arm)

to 7000 x 3218 x 2500 (dual arm)

ISO 10360 Performance Specs ( $\mu\text{m}$ )

$\text{MPE}_E = \text{from } 30 + 25 \text{ L}/1000$





Series T



Series R



Series C

Models	xx.14.16
	xx.14.21
	xx.14.25
	xx.14.30
	xx.16.16
	xx.16.21
	xx.16.25
	xx.16.30
	xx.20.16
	xx.20.21
	xx.20.25
	xx.20.30

Designed to provide maximum flexibility and suitability to a variety of applications, **DEA MERCURY** is available in both manual and automatic versions, as well as in single, double and even multiple-arm configurations. The combination of performance and affordability makes DEA MERCURY the ideal solution for any budget requirement.

**Console** – ideal for mid-size parts. The arm slides on guideways located at the side of the workplate (**DEA MERCURY C** models).

**Runway** – ideal for the measurement of medium, large and very large parts and/or heavy parts. The arms slide on self-standing beams (**DEA MERCURY R** models). As an alternative, the arm can be installed on the top of a worktable (**DEA MERCURY T** models), either supplied with the machine or by the customer.

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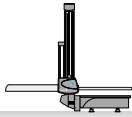
Measuring Range (mm)  
from 2500 x 1400 x 1600

ISO 10360 Performance Specs ( $\mu\text{m}$ )  
 $\text{MPE}_E = \text{from } 15 + 20 \text{ L}/1000$

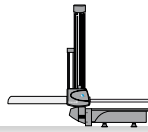




Series xx.14.16



Series xx.16.21



Series xx.16.25

The **DEA BRAVO Console** is a technically advanced and cost-effective solution for flexible and accurate dimensional inspection of thin-walled components, ideal for mid-size parts in industrial environments. The guideways located on the side of the machine base (Console architecture) allow the arm to be moved fully outside of the working area. This allows for optimal access to the work area for simple part loading/unloading operations. The cast iron machine table features the exclusive three-point support system, which eliminates the need for costly dedicated foundations, and makes the installation on vibration dampers easier. Two versions are available: DEA BRAVO C and DEA BRAVO C HS (High Speed).

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Measuring Range (mm)

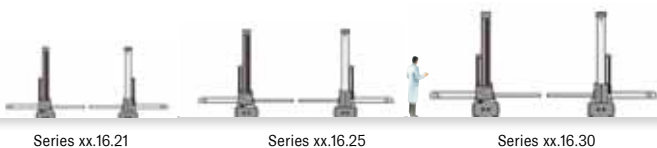
from 3000 x 1400 x 1600 (single arm)

to 6000 x 1600 x 2500 (double arm)

ISO 10360 Performance Specs ( $\mu\text{m}$ )

$\text{MPE}_E = \text{from } 15 + 10 \text{ L}/1000$





**DEA BRAVO HD** is a line of heavy-duty superior performance horizontal arm measuring machines, designed and engineered to provide accurate dimensional measurements on automobile bodies, subassemblies and panels in shop environments and metrology rooms. DEA BRAVO HD's structure has been conceived and engineered in compliance with the most stringent industry standards to ensure accuracy, reliability and ease of use under all operating conditions and for maximum operator safety. All models are direct computer control systems capable of high dynamics, high accuracy and very long measuring strokes, thus providing maximum productivity and higher operating efficiency. DEA BRAVO HD is available in either a single or a dual arm configuration, equipped with the TESASTAR-m motorized indexable probe head in the standard configuration and with the CW43L-mw continuous servo wrist as an option.

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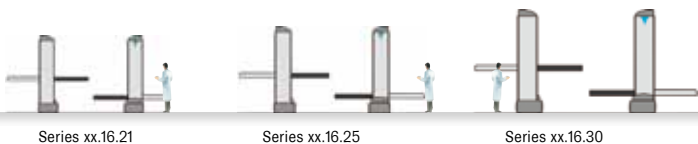
Measuring Range (mm)

from 4000 x 1600 x 2100 (single arm)  
to 9000 x 3120 x 3000 (double arm)

ISO 10360 Performance Specs ( $\mu\text{m}$ )

$\text{MPE}_E = \text{from } 20 + 13 \text{ L}/1000$





**DEA BRAVO HP** is the series of horizontal-arm automatic systems characterized by high performance, and designed to meet in an optimum way the requirements of dimensional inspection and analysis of bodyshells, chassis, and subassemblies on the shopfloor. The DEA BRAVO HP systems are designed to guarantee maximum uncompromising operating flexibility, and for best-in-class dynamic and metrologic performance. The DEA BRAVO HP systems are available in single and dual arm configuration. They may be equipped both with the TESASTAR-m motorized indexable probe head and with the CW43L-mw continuous servo wrist, also in 3 continuous axes configuration for optimum control of non-contact sensors.

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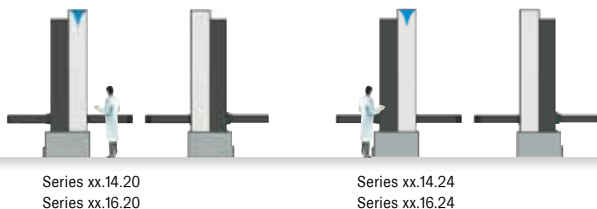
Measuring Range (mm)

from 4000 x 1600 x 2100 (single arm)  
to 9000 x 3130 x 3000 (double arm)

ISO 10360 Performance Specs ( $\mu\text{m}$ )

$\text{MPE}_E = \text{from } 15 + 10 \text{ L}/1000$





**DEA BRAVO HA** is an advanced line of measuring and inspection robots for high-speed flexible in-process gaging of car bodies and subassemblies. DEA BRAVO HA are rugged, fast, and highly reliable systems designed to operate in the harshest industrial environments, for production process monitoring and control.

The systems are designed to be easily integrated into the production line and can be equipped with exclusive high-speed non-contact measuring heads that allow inspecting sheet metal features in 1/10 of the time currently needed with conventional probing systems.

---

#### Measuring Range (mm)

from 6000 x 1400 x 2000 (single arm)  
to 7000 x 3150 x 2400 (double arm)

#### ISO 10360 Performance Specs (µm)

$MPE_E = \text{from } 13 + 10 L/1000$





## Flexible Fixturing Systems

**FIVE U-nique** is an advanced flexible fixturing system that allows program-driven configuration of very accurate part holding fixtures for measurement and inspection applications. The CMM, equipped with a special locating gripper, drives the operator in building the fixture using modular supports and reference devices.



An interactive software program supports rapid production of complete fixturing programs for an unlimited number of part configurations.

Benefits: reduction of the costs associated to the development, production, maintenance, and storage of part holding fixtures.







The **Leitz** brand as part of Hexagon Metrology stands for high accuracy coordinate measuring machines, gear inspection centers and probes. Leitz measurement systems master quality assurance tasks equally well both in metrology labs as well as on the shop floor. The development and production are located in Wetzlar, Germany.

For more than 30 years Leitz has been offering its customers the best innovative measurement technology available. The primary goal remains offering modern solutions for demanding measurement tasks. **[www.leitz-metrology.com](http://www.leitz-metrology.com)**

## **Coordinate measuring systems**

66	Leitz PMM-C
67	Leitz Infinity
68	Leitz Reference HP
69	Leitz Reference Xi/Reference XT
70	Leitz PMM-F
71	Leitz PMM-G
72	Leitz SIRIO SX
	Scanning probes and styli racks
73	LSP-X5
	LSP-X3c
74	LSP-X3t
	LSP-X1c
75	LSP-X1s/LSP-X1m/LSP-X1h
	Styli racks for LSP-X probes
	Software
110	PC-DMIS
115	Surfer EVO
116	QUINDOS
117	Service
118	Contacts



Models 8.10.6  
12.10.6  
12.10.7



Models 16.12.7  
24.12.7  
24.16.7



Models 16.12.10  
24.12.10



Model 24.16.10

The **Leitz PMM-C** is a fixed bridge/moving table-type coordinate measuring machine. It combines ultra-high accuracy with outstanding speed, thus ensuring a very high throughput. This coordinate measuring machine is fast, affordable and allows to perform all measuring tasks, even the most complex ones.

The Leitz PMM-C is also offered as a Gear Inspection Center. It can accommodate maximum outside diameters up to 1550 mm. Thanks to its LSP-S2 probe system, the CMM fits the requirements of any measuring task in dynamic Single Point Probing, Self-Centering in all axes, and obviously standard High-Speed-Scanning.

---

#### Measuring Range (mm)

from 800 x 1000 x 600 to 2400 x 1600 x 1000

#### ISO 10360 Performance Specs (μm)

$MPE_E = \text{from } 0.4 + L/1000$

$MPE_P = \text{from } 0.5$

$MPE_{THP} = \text{from } 1.4 \mu\text{m}/45 \text{ s}$





Model 12.10.7

For the **Leitz Infinity**, Hexagon Metrology drew on the whole of their long-standing experience, optimizing the latest technical developments to create a CMM boasting the highest available accuracy. The Leitz Infinity achieves measurement results which are excruciatingly exact.

The result is the interplay of different components, giving an absolute accuracy better than  $0.3\ \mu\text{m}$  with a reproducibility better than  $0.1\ \mu\text{m}$ .

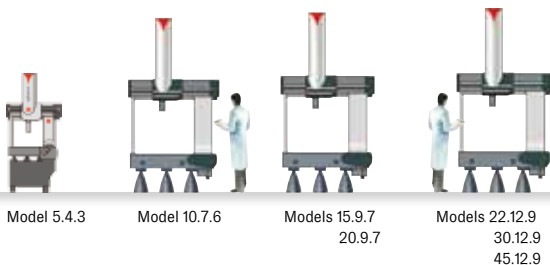
The Leitz Infinity is equipped with the 3D-Scanning System LSP-S4 for extremely precise form and profile measurements. LSP-S4 is enhanced by the ultra-low probing force of 0.02 to 0.16 N.

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Measuring Range (mm)  
1200 x 1000 x 700

ISO 10360 Performance Specs ( $\mu\text{m}$ )  
 $\text{MPE}_E = 0.3 + L/1000$   
 $\text{MPE}_P = 0.4$   
 $\text{MPE}_{THP} = 1.2\ \mu\text{m}/59\ \text{s}$





The **Leitz Reference HP (High Precision)** is a bridge-type CMM with movable portal – the ideal machine in its class for complex measuring tasks, combining high accuracy with optimum throughput.

Available in various sizes it ensures a fast, precise and cost-effective inspection of workpieces.

Equipped with the Leitz 3D probe system, the Leitz Reference HP can accomplish inspection tasks in Single Point Probing, Self-Centering and standard High-Speed-Scanning mode.

The Leitz Reference HP is also offered as a Gear Inspection Center. It can accommodate maximum outside diameters up to 1150 mm.

---

#### Measuring Range (mm)

from 500 x 400 x 300 to 4500 x 1200 x 900

#### ISO 10360 Performance Specs (µm)

$MPE_E = \text{from } 0.8 + L/400$

$MPE_P = \text{from } 0.8$

$MPE_{THP} = \text{from } 1.6 \mu\text{m}/40 \text{ s}$





Model 10.7.6

Models 15.9.7  
20.9.7

Model 22.12.9

The excellent Leitz Scanning Performance continues to the new CMM series **Leitz Reference Xi** and **Leitz Reference XT**. The series scores with a wide range of different probing systems. Accurate measurements are ensured – be it when measuring with indexable or fixed probe heads. Thanks to the multisensor-controller Leitz Reference Xi and Leitz Reference XT are also ready for integration of optical measuring sensors. The name of the Leitz Reference Xi speaks for itself: "Xi" stands for "flexible". The Leitz Reference XT additionally offers outstanding temperature stability: Within the eXTended temperature range from 15 to 30 degree Celsius the Leitz Reference XT measures reliably thanks to a sophisticated temperature compensation system.

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#### Measuring Range (mm)

from 1000 x 700 x 600 to 2200 x 1200 x 900

#### ISO 10360 Performance Specs (µm)

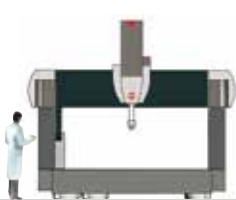
$MPE_E = \text{from } 1.2 + L/350$

$MPE_P = \text{from } 1.2$

$MPE_{THP} = \text{from } 2.2 \mu\text{m}/45 \text{ s}$







Model 30.20.10



Model 30.20.16

**Leitz PMM-F** is a high-accuracy monolithic gantry measuring machine for large-size workpieces. It achieves high throughput with highest possible accuracy. The Leitz PMM-F is also available with a large measuring volume of up to 9.6 m<sup>3</sup>. It does not require costly foundations and can therefore be easily moved. As a standard the Leitz PMM-F offers an active damping system. With its LSP-S2 probe system, it can perform accurate and fast single-point probing as well as High-Speed-Scanning for form and profile measurements.

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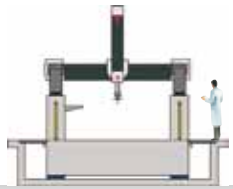
#### Measuring Range (mm)

from 3000 x 2000 x 1000 to 3000 x 2000 x 1600

#### ISO 10360 Performance Specs (µm)

temperature range	18-22 °C	18-24 °C
MPE <sub>E</sub>	from 1.7 + L/400	from 1.7 + L/300
MPE <sub>P</sub>	from 1.5	from 1.5
MPE <sub>THP</sub>	from 2.4 µm/68 s	from 2.4 µm/68 s





Models	xx.20.12
	xx.30.12
	xx.40.12
	xx.20.16
	xx.30.16
	xx.40.16
	xx.20.20
	xx.30.20
	xx.40.20
	xx.30.25
	xx.40.25
	xx.30.30
	xx.40.30

The **Leitz PMM-G** provides highest accuracy and a highly enhanced throughput for large-size XXL workpieces. These workpieces are used for example in aircraft and aerospace industries, ship engine constructions and measurement of large gears used in wind turbines. With this development, the probing frequency, acceleration, maximum speed and scanning Performance are significantly enhanced.

The Leitz PMM-G features an overhead design with integrated U-shaped foundation for highest accuracy and high throughput. As a result, all moving masses have been minimized. The X axis is equipped with dual drive motion system and transducer systems. The Leitz PMM-G is equipped with the Leitz LSP-S2 Scanning Probe system. This probe head measures very precisely even with long and heavy styli. Styli configurations of up to 800 mm and 1 000 g are possible.



#### Measuring Range (mm)

from 3000 x 2000 x 1200 to 7000 x 4000 x 3000\*)

#### ISO 10360 Performance Specs (µm)

$MPE_E$  = from 2.4 + L/400

$MPE_P$  = from 1.9

$MPE_{THP}$  = from 3.3 µm/68 s

\*) other sizes available upon request





Model 6.8.9

For decades the Leitz SIRIO has proven itself as a measuring robot especially in the automotive industry. This coordinate measuring machine is classified as the ideal machine to measure powertrain-components highly accurately within shop floor environments. Now a new generation of Leitz SIRIO is raring to go: **Leitz SIRIO SX**. This machine is even more accurate, faster and more robust – thus, even more efficient than ever before. One of the highlights of the new Leitz SIRIO SX is the improved temperature resistance. The machine base consists of a special heat-resistant material which allows for constant temperature compensation. For the user this means that there is no climate control necessary within a range from 15 to 40 degrees Celsius. A host of other features enhance the efficiency of Leitz SIRIO SX.

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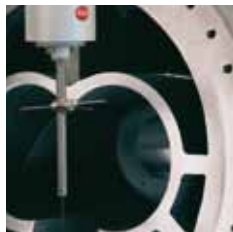
Measuring Range (mm)  
600 x 800 x 900

ISO 10360 Performance Specs ( $\mu\text{m}$ )  
 $\text{MPE}_E = \text{from } 1.3 + L/400$   
 $\text{MPE}_P = \text{from } 1.3$   
 $\text{MPE}_{THP} = \text{from } 1.9 \mu\text{m}/24 \text{ s}$





**LSP-X5** – Ultra-precise, full 3D, fixed scanning probe head capable of simultaneously measuring in the X, Y, and Z directions to precisely define the orientation of the workpiece surface. This heavy-duty analog probe features very high and repeatable accuracy even with extra-long probe extensions and heavy styli clusters (up to 500 mm of length and 500 g of weight). It includes a proprietary anti-collision system for extra protection of the head. The LSP-X5 is the ideal tool to verify high accuracy mechanical parts and complex geometries.



**LSP-X3c** – A compact, cost-effective yet extremely accurate, 3D fixed scanning probe head which can carry up to 360 mm long probing extensions and styli clusters. The LSP-X3c offers fast single-point probing for all standard measuring tasks as well as high-speed scanning for form and profile inspection and is ideally suited for dimensional control of small-to-medium high accuracy prismatic parts and complex geometries.





**LSP-X3t** – A 3D scanning probe for use on an articulated wrist featuring very high and repeatable accuracy.

It can rapidly and automatically collect thousands of data points for the complete and precise evaluation of all part features, including form, location and size. LSP-X3t high-speed data collection greatly increases the accuracy, speed and flexibility of measurements.



**LSP-X1c** – Fixed 3D scanning probe head. The LSP-X1c is a cost effective solution with a fixed dove-tail quill mount. This probe head is optimised for stylus lengths up to 115 mm vertically and 50 mm horizontally. All standard measurements such as dynamic single-point inspection, High-Speed-Scanning as well as Self-Centering measurements for highly accurate form and contour inspection are possible.



**LSP-X1s/LSP-X1m/LSP-X1h** – scanning probes of the Leitz X-Series that have been specifically designed for CMMs equipped with motorized indexing probe heads. LSP-X1 is available in different probe modules, each optimized for a specific stylus length ranging from 20 to 225 mm. LSP-X1 supports all standard probing modes: Single Point Probing, Self-Centering as well as Continuous High-Speed-Scanning for fast, accurate form and profile measurements. Like all other Leitz Probes, LSP-X1 allows simultaneous, unclamped probing on all axes, always orthogonal to the contact surface.



**Styli racks for LSP-X probes** – The automatic tool changing capability allows styli change within a measuring program without the need for probe requalification. Magnetic or pneumatic clamping of styli on the head permits fast and reliable changes.





Hexagon Metrology is the all-rounder in the world of metrology. With its new brand **Optiv**, the world's largest metrology group keeps this promise once again. Optiv stands for multi-sensor measuring machines of any kind. The portfolio ranges from benchtop measuring machines to high-accuracy multi-sensor measuring machines which achieve top performances even in the nano range. Multi-sensor measuring machines combine optical and tactile measuring techniques and thus, enable the user to measure all features of a workpiece in one measurement cycle. At the same time Optiv features both: flexibility and accuracy.

Optiv. Optical Performance Technology in Vision.

**[www.optiv.net](http://www.optiv.net)**

	<b>Optical and multi-sensor measuring systems</b>
78	Optiv Classic
79	Optiv Performance
80	Optiv Advantage
81	Optiv Reference
82	OptivScan
	Sensors
83	Vision-Sensor
	Through-The-Lens-Laser (TTL-Laser)
84	Chromatic White Light Sensor (CWS)
	Software
112	PC-DMIS Vision
117	Service
118	Contacts





Measuring machines in the **Optiv Classic** line are efficient, compact units with an excellent price-performance ratio. The range includes two table benchtop machines with a very low space requirement and mechanical bearings on all axes as well as an air-bearing gantry model. Thanks to their practice-proven construction features and an extremely reliable opto-electronic measuring system, the Optiv Classic models can cover a broad spectrum of measurement needs and are most suitable for use in a production environment. These systems represent a cost-efficient entry into the world of multisensor technology.

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Measuring Range (mm)

from 300 x 200 x 150 to 400 x 500 x 300

ISO 10360-7 Vision Performance Specs ( $\mu\text{m}$ )

$E_{xy}$  = from 2.0 + L/250

ISO 10360-2 Tactile Performance Specs ( $\mu\text{m}$ )

$MPE_E$  = from 2.5 + 6L/1000





The **Optiv Performance** range can tackle many measuring tasks with its robust design in granite, its axes with mechanical bearings and the complete range of sensors. Two cross-table models and four further gantry designs make the Optiv Performance line the first choice for measuring smaller or larger parts – including those in a production environment. Ambient effects in the production environment such as dirt, dust, and floor vibration, are eliminated by the covered guide-ways and integrated damping systems. The effects of temperature in the production environment can further be addressed with optional machine enclosures.

---

Measuring Range (mm)

from 250 x 200 x 200 to 920 x 800 x 200

ISO 10360-7 Vision Performance Specs ( $\mu\text{m}$ )

Exy = from 1.5 + L/150

ISO 10360-2 Tactile Performance Specs ( $\mu\text{m}$ )

MPE<sub>E</sub> = from 2.9 + L/1000





The **Optiv Advantage** line offers the largest range of models. It combines universal multisensor technology with consistent, high measuring accuracy. The principle behind this line: a low-vibration granite construction with fixed bridge and air bearings on all axes. Some models in the Optiv Advantage line have the exclusive Dual-Z-Design. Choose the optimal measuring range in the Z direction: 300 mm, 450 mm or 600 mm. The complete selection of sensors is available for the Optiv Advantage series as is extensive additional equipment such as, for example, motorized indexable probes and various rotary table combinations. As a result the Optiv Advantage line ensures universal adaptation to suit your high accuracy 3D measuring tasks.

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#### Measuring Range (mm)

from 450 x 400 x 300 to 1050 x 1000 x 600

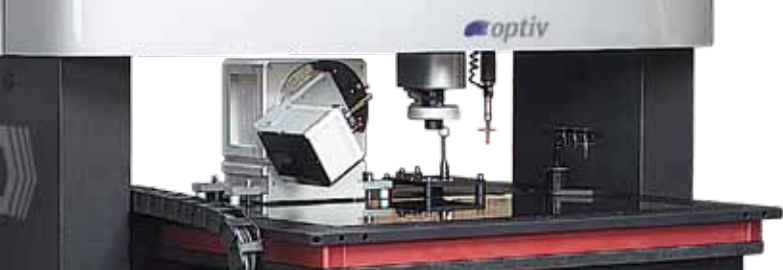
#### ISO 10360-7 Vision Performance Specs ( $\mu\text{m}$ )

$E_{xy}$  = from  $1.1 + L/500$

#### ISO 10360-2 Tactile Performance Specs ( $\mu\text{m}$ )

$MPE_E$  = from  $1.8 + L/400$





The premium offering with respect to measuring accuracy and design is the **Optiv Reference** line. It provides high precision 3D measurements with very tight production tolerances. A stiff granite construction with the most advanced design materials, air bearings on all axes and optional vibration dampers provide an unsurpassed solution for your metrology requirements.

The exclusive Optiv Dual-Z-Design is included as standard on all Reference types, as is the complete range of sensors and the extensive additional equipment, for example, motorized, indexable probes and various rotary table combinations. The Optiv Reference line is the optimum solution for complex, high precision 3D part measurements.

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#### Measuring Range (mm)

from 530 x 400 x 300 to 730 x 600 x 300

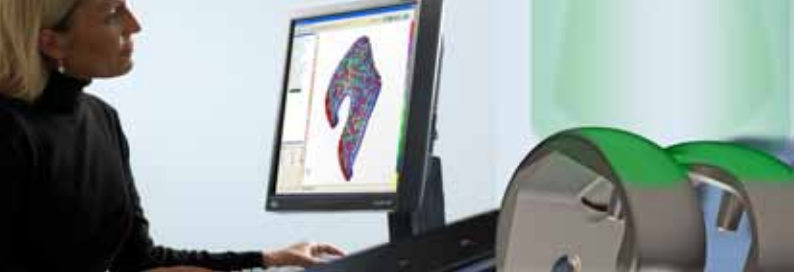
#### ISO 10360-7 Vision Performance Specs ( $\mu\text{m}$ )

$E_{xy}$  = from  $0.8 + L/400$

#### ISO 10360-2 Tactile Performance Specs ( $\mu\text{m}$ )

$MPE_E$  = from  $1.3 + L/400$





Scanning is the ideal method to gather data of a workpiece quickly and with a high density of measuring points. The new multi-sensor measuring machine **OptivScan** offers two ways of reaching highly accurate measuring results: Non-contact measurements via the Vision-Sensor and tactile measurements via the Leitz Scanning probe head LSP-X1c. Either way the user is supported by PC-DMIS – the measuring software for programming with CAD-models. The low-vibration granite construction with fixed bridge and air bearings on all axes are the basis for high accuracy and high travel speeds.

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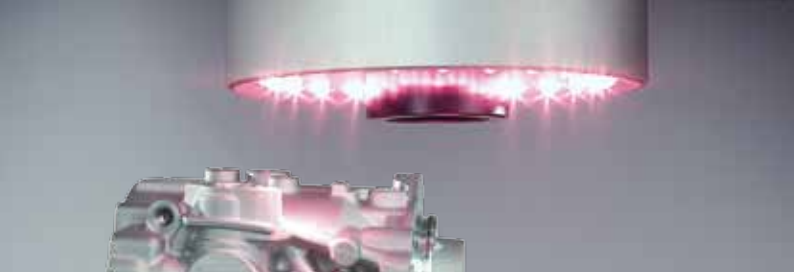
Measuring Range (mm)  
650 x 600 x 300

ISO 10360-7 Vision Performance Specs ( $\mu\text{m}$ )  
 $E_{xy} = 1.3 + L/400$

ISO 10360-2 Tactile Performance Specs ( $\mu\text{m}$ )  
 $MPE_E = 1.9 + L/300$   
 $MPE_P = 1.5$

ISO 10360-4 Scanning Performance Specs ( $\mu\text{m}$ )  
 $MPE_{THP} = 2.0 \mu\text{m}/90 \text{ s}$





**Vision-Sensor** – The Vision-Sensor is the image-processing measurement sensor for Optiv measuring machines. It can perform non-contact measurements on the smallest features subject to the tightest tolerances, accomplishing the sort of tasks that could not be accomplished with a probe, while avoiding deformations of the inspected part often caused by mechanical probes. The object being measured is captured through the lens on a matrix camera (CCD camera). The optical signals are converted into a digital image and further processed to calculate the coordinates of the measured points by the imaging processing routines in the PC-DMIS Vision measurement software package.



### **Through-The-Lens-Laser (TTL-laser)**

By coaxially injecting the laser light into the optics, the laser is focussed in the middle of the field of view acquired by the camera (Vision-Sensor). As a result the measuring speed on the simultaneous usage of laser measurement and video measurement in a measuring routine is accelerated.

Example applications for the TTL-laser:

- Quick focussing of the Vision-Sensor
- Precise measurements of heights, hole depths and flat surfaces
- Contour and surface scanning





### **Chromatic White Light Sensor (CWS)**

A measuring sensor with extremely high resolution is required for measurements in the micron range. Glossy surfaces also represent a challenge in vision metrology. The Chromatic White Light Sensor (CWS) is the ideal choice:

- For the topographical acquisition of micro-structures
- For the digitisation of glossy surfaces (e.g. glass, polished metal)
- For the digitisation of transparent materials







**Hexagon Metrology** offers matching probing systems and styli for all portable and stationary measuring systems, including probing for machine tools.

For coordinate measuring machines the range is a complete offering of touch probes, manual and motorized probe heads, analogue scanning probes, change racks, extensions and styli.

**[www.hexagonmetrology.com](http://www.hexagonmetrology.com)**

## **Hexagon Metrology Probing systems for CMMs**

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CMS Sensor

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### **CMM-Ve Sensor**

CMM-Ve cameras are designed to be a general purpose image analysis tool for enhancing the measurement capabilities of a CMM.

It provides oblique overhead illumination of the feature being inspected. CMM-Ve cameras are very versatile and have many potential applications for the CMM user. Due to their general-purpose nature CMM-Ve cameras are provided with a fixed magnification and are intended for taking data points in a static condition. The CMM-Ve contains a customisable illumination system, which makes it a self contained measuring system, suitable for a wide range of applications.

The CMM-Ve is compatible with the automatic probe changer TESASTAR-r. This system allows the CMM to change the sensor being used, enabling the CMM-Ve to be integrated within multiple sensor part programs, and allows sensor exchanging without the need for any operator intervention.



### **CMS Sensor**

The CMS106 is a laser line scanning probe with two unique features:

- three level zoom offering a 24, 60 or 124 mm laser line
- automatic, real-time laser power adjustment

The CMS106 is available on bridge and horizontal arm coordinate measuring machines. The probe offers rapid non-contact metrology for three key application areas: free form surface inspection, sheet metal feature inspection and reverse engineering.



### **CW43L-mw**

CW43L-mw Continuous Wrist is a heavy-duty precision mechanism able to quickly orient the probe to any attitude following precise 3D trajectories. Its speed and motion are continuously controlled by the system controller to reach maximum machine efficiency.

Its ability to orient the probe as needed in space (virtually infinite angular positions) along with the possibility to handle exceptionally long probe extensions, allow full access to the part being measured.

The CW43L-mw is also available in the configuration with integrated 3rd continuous axis developed for the optimized use of non-contact sensors.

The CW43L-mw wrist is compatible with both point-to-point TESA probes and other probes and tip/tool changers, thus enabling measuring both in point-to-point and scanning modes.



### **CW43L-mw AC**

CW43L-mw AC is an automatic tool changer that allows fast automatic change of probes and extensions on the CW43L-mw continuous wrist without the need for requalification.





Established in 1941, **TESA SA** manufactures and markets today more than 5 000 dimensional metrology products, ranging from high-precision hand-held tools to sophisticated measuring systems. CMM products and vision systems for non-contact measurement are now also included. Most of them are produced under the SWISS MADE Label. A worldwide direct sales and distribution network is one of the major assets of the Swiss company whose primary markets are the automotive, aerospace, watch-making and metal processing.

**[www.tesabs.ch](http://www.tesabs.ch)**

## **Probing systems for CMMs**

92	TESASTAR-i TESASTAR-i M8
93	TESASTAR-m TESASTAR-m M8
94	TESASTAR-sm TESASTAR-rp
95	TESASTAR-p TESASTAR-mp
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### **TESASTAR-i Indexable Probe Head**

TESASTAR-i is a manual indexable probe head with integrated high-precision touch trigger probe. The indexing capability in increments of  $15^\circ$  in two axes allows the operator to tilt the stylus through a number of positions as high as 168 without the need for requalification. A numeric display on the head shows the angular position of the probe. Axes can be released with one hand using a device located on the main body of the head.



### **TESASTAR-i M8 Indexable Probe Head**

Constantly looking at the users' needs and mainly concerned with designing components that are not just robust but also efficient and powerful, TESA is definitely focusing on technological innovation. The TESASTAR-i M8, which embodies the latest development from R&D, provides the same functionalities as TESASTAR-i. The key to this version is its ability to accommodate any type of probes or accessories fitted with a M8 threaded connection like all TESASTAR-p, TESASTAR-mp or TESASTAR-rp probes.



### **TESASTAR-m Motorised Probe Head**

TESASTAR-m is a motorized articulating probe head capable of indexing in 5° increments for a total of 2 952 possible positions. A new version is available with 7.5° increments for a total of 720 possible positions. The indexing speed of the TESASTAR-m is higher than the one of corresponding products on the market, allowing for dramatically reduced cycle times. This head also features robust construction and rugged design permitting extension rods with lengths up to 300 mm. The TESA kinematic joint allows the direct docking of continuous scanning sensors. Coupled with an M8 adaptor, it can be used with TESASTAR-p touch-trigger probes as well as probes of other makes.



### **TESASTAR-m M8 Motorised Probe Head**

Similar to TESASTAR-m, this probe head is fully automated and controlled over PC-DMIS. Due to its compatibility with any accessory having a M8 mounting thread, no adapter is required. Combining robustness with coupling force, this efficient tool further expands the wide range of Swiss-made high-accuracy components designed and produced by TESA.







### **TESASTAR-sm Motorised Probe Head**

TESASTAR-sm is a fully motorised probe head that offers excellent positional repeatability. The indexing capability in increments of  $5^\circ$  allows the probe head to rotate through to  $180^\circ$  as well as angles ranging from  $+90^\circ$  to  $-115^\circ$  to be reached. The total number of positions is as high as 2 952. A new version is available with increments of  $7.5^\circ$  allowing to reach angles ranging from  $-180^\circ$  to  $+180^\circ$  on the B-axis and  $0^\circ$  to  $+105^\circ$  on the A-axis for a total of 720 positions.

Being compactly sized, this probe head can directly be fitted on the Z-axis (65 or 80 mm square section) of nearly all existing CMMs, thus resulting in a noticeable volume increase. Available in two distinct versions, this new model can either be supplied with a kinematic joint or an M8 mounting thread for coupling the needed accessory.



### **TESASTAR-p**

Full selection of omni-directional touch-trigger probes. Fitted with a common M8 threaded connection, they can be used with most existing probe heads. These probes are available in 4 choices of trigger force – from 0.55 N to 0.1 N.

For automatic operation, TESASTAR-p is fitted to the TESASTAR M8 automatic joint: this way the automatic change of the probe can be performed with the TESASTAR-r tool changing device. Thanks to the high accuracy of the tool changing system, probe requalification is not required after change.



### **TESASTAR-mp**

This probe consists of two main parts, i.e. the mounting module and the probe itself. Both parts are put together by means of a magnetic coupling system ensuring a repositioning repeatable to 0.1  $\mu\text{m}$  while allowing manual or automatic probe changing with no need for recurrent qualification. The four models available have also a varying measuring force contained within 0.055 N and 0.10 N. Their M8 threaded connection permits a direct assembly with nearly all existing measuring heads. Used in conjunction with TESASTAR-pr specially made to handle this type of probes, TESASTAR-mp is the ideal solution for fast and accurate coordinate measurement of part features.



### **TESASTAR-rp Probe**

TESASTAR-rp is a rugged and accurate touch trigger probe that can be mounted on many kinds of coordinate measuring systems. This probe can operate in any industrial environment even in the most hostile. Optimized accuracy is ensured through an adjustable trigger force according to the chosen stylus configuration.





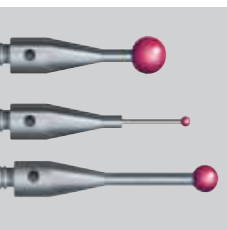
### **TESASTAR-r Automatic Probe Changer**

Automatic modular probe changer. Available in 3 configurations – with 3, 5 and 9 modules. It allows the automatic change of extensions, sensors and styli without the need for tool requalification. When required, further modules, 40mm or 65mm long, can be added to sensors with particularly large working volume. The probe supplied with the tool changer is generally used for qualification but can also be used for normal measurement tasks.



### **TESASTAR-pr Automatic Module Changer**

This model is specially designed for swapping magnetic probes. Available in two sizes (90 or 150 mm), the three main versions include 1, 2 or 3 double modules. Extra modules that are also compatible with TESASTAR-pr can any time be installed.



**Probe styli**, extensions and all other accessories included in the dedicated programme for three-axis measurement have been specially designed by our engineers. Produced at Renens under the SWISS MADE label, each product gives evidence of a consistent family to customers.



### **TESA CAL IP67 magna μ system**

Electronic caliper – The highest degree of protection ever achieved with hand-held tools of this type – Totally immune to the penetration of liquids and particles of metal. Magnetic measuring system – a TESA's technology guaranteeing full reliability and accuracy, even in the toughest conditions of use – SWISS MADE.



Based on the well-proven TESA technology for more than 25 years, the **TESA-HITE magna 400 and 700** are ruggedly built for use even in the most hostile workshop environments due to their environmental sealing protecting against liquids and dust. Each height gauge comes equipped with the patented TESA magna μ system.





The whole **TESA-SCAN** product line belongs to the range of opto-electronic measuring centres that provide users with a complete solution for fast inspection of small round parts. As each center includes several systems such as those usually integrated into profile projectors or microscopes, they provide a more capable alternative to traditional inspection methods. TESA offer a full product family that's able to measure round parts with diameters from 0.3 to 80 mm whose length can reach up to 500 mm.



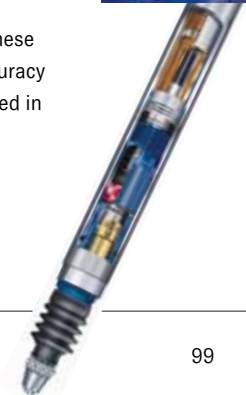


**TESA UPD** – The flexible concept that provides distinctive metrological features with substantial savings.

- Permits over 90% of a 122-piece set to be checked using the same Reference gauge block. All nominal lengths of the full gauge set being contained within 0.5 and 25 mm, the measuring span is therefore not exceeded.
- Allows the gauge blocks of same nominal lengths to be measured by comparison.
- Reduces the number of systematic errors through limited length related influences of both the upper probe A and the gauge block to be compared.

### **TESA Electronic Probes at the fore front in precision measurement**

TESA has been a leading designer, manufacturer and user of inductive probes for more than 40 years. Its high-precision electronic probes are made to withstand the stress sustained in the production environment where they can be constantly used for series inspection. At the same time, these probes are also designed for high-accuracy measurements such as those performed in gauge block calibration.





**m&h** Inprocess Messtechnik GmbH is the technological leader in on-machine gauging. Today many well respected companies around the world can be found using m&h probe systems and software. m&h is characterized by its strengths in: machine tool know-how, continuous technical innovation, focusing on customer manufacturing processes, and application engineering. Individualized, customer focused advice and development of special applications are part of our commitment to excellence. A worldwide sales and support network ensures m&h products are available wherever your business takes you.

**[www.mh-inprocess.com](http://www.mh-inprocess.com)**

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### **Infrared Probing Systems**

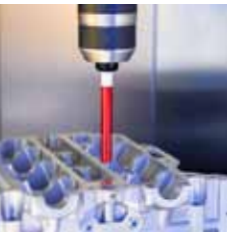
m&h infrared probes are touch trigger probes. When approaching a workpiece surface, the stylus deflects and a trigger signal is transmitted to the receiver by infrared light. Interference-free signal transmission between probe and receiver is absolutely vital for process-reliable measuring on machine tools. HDR (High Data Rate) technology avoids interference caused by ambient light from outside and inside the machining area. On the one hand we use the 75 Hz transmission frequency which is different from worldwide line frequencies of 50 Hz or 60 Hz, respectively. On the other hand, an extremely high data rate of 9600 light pulses/sec prevents interference from pulsing machine lamps. Adjustable transmitting power and large transmitting angles go without saying for m&h touch probes. Large receiving angles and microprocessor-controlled evaluation of receiving signals give an absolutely perfect infrared light transmission.



### **Radio-wave Probing Systems**

m&h radio-wave probes are touch trigger probes. When approaching a workpiece surface, the stylus deflects and a trigger signal is transmitted to the receiver by radio wave. This receiver converts the radio waves to an electrical signal sent to the control. Interference-free signal transmission between probe and receiver is absolutely vital for process-reliable measuring on machine tools. Radio transmission is effected in the 433 MHz frequency band being internationally approved and providing particularly high penetration. 64 channels can be easily adjusted on the digital display both on the probe and the receiver. The patented SCS (Self Channel Select) technology of the microprocessor-controlled receiver responds to interference signals by continuously checking the environment. The receiver will block corrupted frequencies from further use and will suggest the best alternative frequency. Combining these two technologies ensures process-reliable radio transmission.





### **Temperature Probe Systems**

By providing a fully automatic measurement of the part temperature at any stage of the machining process (patented), the temperature probe enables manufacturing processes to be controlled and machining parameters to be adjusted during production. Interference-free signal transmission between probe and receiver is absolutely vital for process-reliable measuring on machine tools. When using infrared light transmission, HDR technology (High Data Rate) developed by m&h and adjustable transmitting power guarantee process reliability. When using radio-wave transmission, the use of a high-penetration frequency range as well as the SCS technology (Self Channel Select) developed by m&h ensure interference-free function with a broad transmission range. Thus, a consistently high manufacturing quality and highest process reliability are achieved.



### **Production Probe Systems**

m&h production probes with their precision measuring mechanics meet all requirements needed for use on machine tools. Our advantages include the ability to withstand constant vibration, increased temperatures and contact with coolant. Despite these factors, m&h precision mechanics ensure wear-free high-precision measuring year after year.



### **Laser Tool Setters**

Non-contact tool measurement allows automatic checks for tool wear or breakage. Constant production quality requires the use of reliable accurate tooling. One vital requirement is precise tool data. The data is automatically transferred to the tool table of the control. Periodic tool checks for broken tools or wear create additional production safety. The Laser Tool Setter from m&h will do this job, saving time and increasing reliability.



### **Tool Setters**

Constant production quality requires the use of reliable accurate tooling. One vital requirement is precise tool data. m&h Tool Setters for tool measurement detect tool length and tool radius directly on the machine. The data is automatically transferred to the tool table of the control. Periodic tool checks for broken tools or wear create additional production safety. The Tool Setter from m&h will do this job, saving time and increasing reliability.





As a technological leader in the on-machine probing and tool checking markets, m&h Inprocess Messtechnik GmbH understands the importance of software in delivering high-productivity solutions for in-process measurement. Only through applying cost-effective, easy to use, capable software, the demands of today's manufacturing processes can be met. m&h applies its in-depth knowledge of production processes at every stage of the software development process to ensure that we deliver high quality software optimised for use on the machine tool. Whether it is to perform a quick set-up, verify a critical dimension in process, or perform complex quality analysis – m&h's suite of software products addresses the needs of machine operators, production and process engineers as well as quality professionals.





Together with our industry partners, we at **Hexagon Metrology** offer you a wide array of customizable software solutions to best complement your industrial metrology application, with the focus on intelligently and effectively collecting, evaluating, managing and presenting your data. Get what you need to reduce scrap, improve throughput and lower costs.

**[www.hexagonmetrology.com](http://www.hexagonmetrology.com)**

## **Software for CMMs**

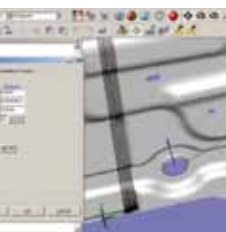
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112	PC-DMIS Vision
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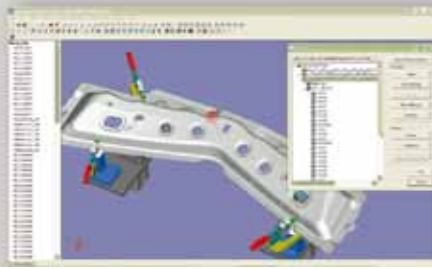
**PC-DMIS** is the world's leading metrology software for Coordinate Measurement Machines. It has an installed base of over 30 000 and is the foundation of the EMS product suite.

PC-DMIS is for manual and DCC machines and comes in three versions: PC-DMIS® PRO, PC-DMIS® CAD and PC-DMIS® CAD++. Each version is carefully tuned to meet differing levels of customer requirements. In addition, a rich set of optional modules enables users to configure PC-DMIS according to their specific needs.



All PC-DMIS products let users:

- Create part programs, inspect parts and report results using a fully configurable GUI (Graphic User Interface) that makes complex operations simple without sacrificing capabilities.
- Define datums, construct features, select geometry and dimension parts with a few mouse clicks, working with a graphical representation of the features.
- Generate reports from a full set of pre-defined templates or customize their output using PC-DMIS's powerful report-builder module.
- Add macros and high-level language routines to meet specific requirements.



**PC-DMIS CAD** lets users:

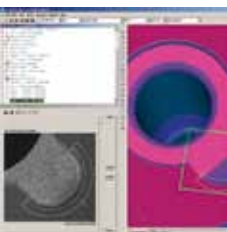
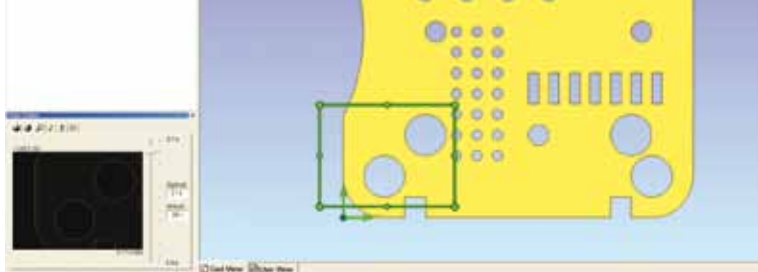
- Import and export CAD models in most standard formats.
- Develop, test, and debug part programs directly on CAD models and extract information directly from the models, eliminating an entire class of errors.
- Compare measured data to the CAD nominals. Report the deviations graphically against the model.
- Simulate program execution on the CAD model, use QuikFixture® to build fixture models into part programs and detect collisions with either parts or fixtures.



For the most demanding applications

**PC-DMIS CAD++** lets users:

- Scan parts using a wide range of probes including hard, touch trigger, analog, lasers and white light. Take Advantage of seven built-in scanning methods.
- Align the most complex aerospace and automotive parts with iterative alignments that allow for the most accurate 2D and 3D fitting of the part to the CAD geometry.
- Measure thin-wall parts and complex contoured geometries with a powerful library of pre-defined routines.
- Troubleshoot problems with a sophisticated set of analytical tools and reverse engineer even the most complicated parts.

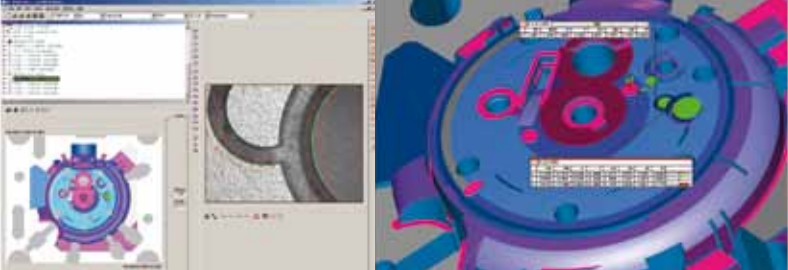


**PC-DMIS® Vision** sets a new standard for Vision Metrology Software. It is the industry's first CAD-based software package, and it is both powerful and easy to use.

This software gives vision metrologists the same capabilities long enjoyed by PC-DMIS CMM users. And because PC-DMIS Vision is part of EMS, all of the systems analytical, reporting and data management capabilities are available.

PC-DMIS Vision lets users:

- Work directly on 3D CAD models to develop, debug and edit programs. Like PC-DMIS CMM, this software extracts information right from the CAD model, eliminating errors of data interpretation and input.
- Program off-line using the CAD drawing and simulate program execution using the unique CADCamera® module, which accurately mimics the operation of the system's camera.
- Reduce the need for the expensive cross-training of operators to use different measurement software and arms.
- Turn a manual machine into a virtual DCC machine using AutoShutter™, which automatically finds and measures features as they come into the camera's field of view.
- Eliminate hard to "see" areas from the measurement. The Split Feature function gives full control over which parts of a feature the software includes in its evaluation.

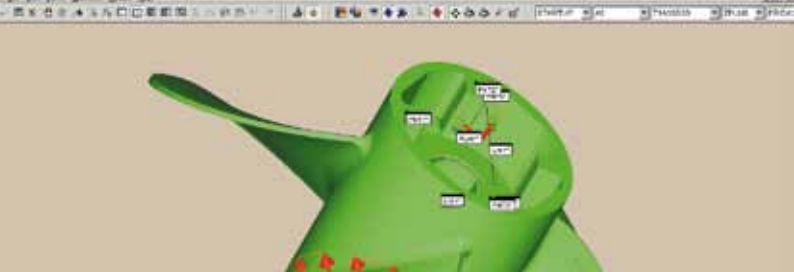


- Use an adaptation of the PC-DMIS's auto feature capability to automatically measure features and create appropriate measurement parameters. Select multiple features to measure by boxing them together.
- Edit inspections sequences easily by changing measurement parameters like point density, edge type and edge strength.
- Share a single screen and toggle between camera and program view with a keystroke.

**PC-DMIS® Inspection Planner Suite** makes "paperless inspection" a reality. It seamlessly links design, manufacturing and metrology operations into a single, lean system.

IP Planner Suite consists of two modules. The first, IP Planner, is CAD based. It lets design engineers build inspection requirements into their models. The second, IP Measure is PC-DMIS based. It reads the inspection plan and converts design intent into measurement programs.



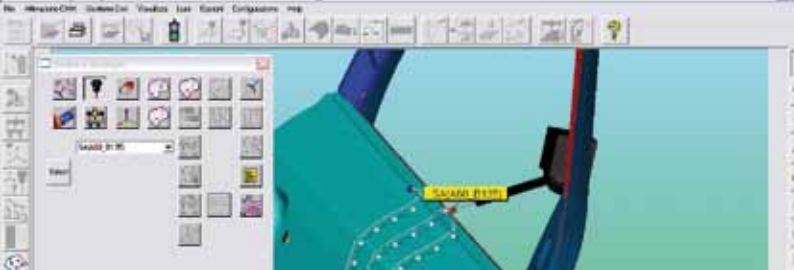


**IP Planner** lets designers:

- Use a CAD model to create a virtual, marked-up blueprint.
- Define the part's datums, dimensions and tolerances off the CAD system's built-in GD&T. This software is an add-in, sharing the look and feel of the host software.
- Electronically close the loop between design, manufacturing and metrology operations and drastically reduce delays and misinterpretations.
- Send inspection plans to any of the PC-DMIS EMS measurement programs.

**IP Measure** lets metrology programmers:

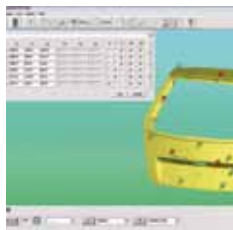
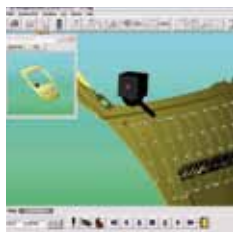
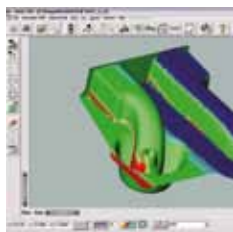
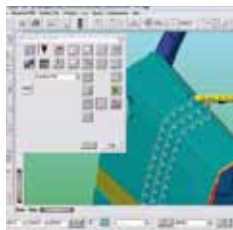
- Automatically turn inspection plans into measurement programs decreasing part programming time by up to 70%.
- Stop manually typing in measurement parameters and minimize data input errors.
- Optimize probe paths for new and existing part programs and detect collisions with both parts and fixtures.
- Use IP Measure without an inspection plan to program feature measurements automatically as well as define and optimize probe movement.

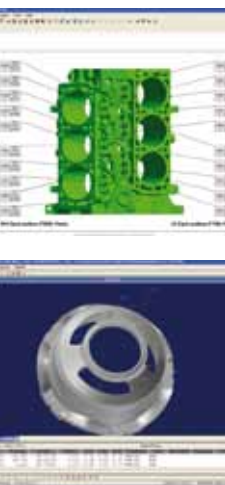
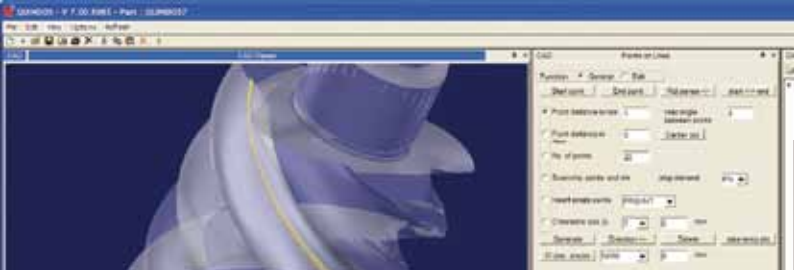


**Surfer EVO** is a powerful and flexible solution offering a larger number of modules to suit a broad range of inspection, quality control, dimensional analysis, reverse engineering and scanning data processing applications.

Surfer EVO offers dedicated tools for off-line analysis and report generation, including creation of part-to-CAD alignments and optimization of measured data, as well as advanced modules for GD&T analysis of free-form models (profile tolerances on surfaces and curves) and prismatic models (location, orientation, form, dimension, linear and angular distances).

Surfer EVO includes specific solutions for profile and thickness analysis, including measuring, programming, evaluation and reporting. A wide range of CAD interfaces for fast import of large parts and assemblies is provided as well as several interfaces with the most common measuring machines. Surfer EVO offers flexible capabilities for point cloud analysis, including alignments, color maps, automatic feature recognition and advanced reporting.





**QUINDOS** is the ideal measuring software for the dimensional inspection of complex contoured shapes on CMMs (gears, gear tools, blades, etc.) and accurate prismatic parts.

QUINDOS 7, the latest version, now features a Windows user interface, that can be tailored to your specific needs. It offers a new kind of programming and automatic measuring tools. The common handling of basic and special geometries measured on a CMM improves the ease of use as well as the software efficiency.

Using CAD models and object-oriented design, QUINDOS 7 combines a high degree of automation with easier use. QUINDOS 7 imports 3D models in the most common CAD formats, and allows to generate, view and evaluate measuring points. In addition, QUINDOS 7 allows you to design your own reports including pictures, tables and artwork. Connecting the server version of QS-STAT from Q-DAS, QUINDOS 7 can directly access the statistics package from its user interface.

**Hexagon Metrology is part of the Hexagon Group and includes leading metrology brands such as Brown & Sharpe, Cognitens, DEA, Leica Geosystems (Metrology Products), Leitz, Optiv, PC-DMIS, ROMER and TESA.**

Hexagon Metrology brands represent an unrivaled global installed base of millions of Coordinate Measuring Machines (CMMs), portable measuring systems and handheld instruments, and tens of thousands of metrology software licenses.

A worldwide, local service organization to support customers from product enquiry to after sales needs.

#### Systems Consultation

- Our specialists and engineers help select the solution that best suits specific manufacturing and inspection needs.

#### Skills Training

- Introductory to advanced metrology courses to optimize CMM productivity.

#### First Part Programming

- Part programs developed by experts for proper start-up of inspection of new components.

#### Contract Inspection and Programming

- A professional solution to production overload or unique measuring applications.
- Possibility of outsourcing dimensional inspection resources and activities to Hexagon Metrology.

#### Software Maintenance Agreements

- Periodic software updates to meet any high technology challenge.

#### Certification and Calibration

- Regular certification and calibration to guarantee the highest levels of system accuracy and repeatability.

#### System Upgrades and Rebuilds

- Old systems revitalized by combining advanced hardware and software with the existing equipment.

#### Service and Repair

- Genuine Hexagon Metrology parts and certified factory service to keep systems running in peak conditions.



# Hexagon Metrology Regional Precision Centers

## Europe

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### AUSTRIA

Wiener Neudorf

Tel.: +43 2236 860 070, Fax: +43 2236 860 070-11

contact.at@hexagonmetrology.com, www.hexagonmetrology.at

### BENELUX

Waalre

Tel: +31 40 222 2210, Fax: +31 40 222 1715

contact.nl@hexagonmetrology.com, www.hexagonmetrology.nl

### CZECH REPUBLIC

Prague

Tel: +420 272 680 830, Fax: +420 272 680 833

info.cz@hexagonmetrology.com, www.hexagonmetrology.eu

### FRANCE

Paris

Tel: +33 1 69 29 12 00, Fax: +33 1 69 29 00 32

commercial.fr@hexagonmetrology.com, www.hexagonmetrology.fr

Lyon

Tel: +33 4 72 37 90 60, Fax: +33 4 72 37 90 61

Toulouse

Tel: +33 5 34 51 70 95, Fax: +33 5 34 51 79 44

Montoire (ROMER)

Tel: +33 2 54 86 40 40, Fax: +33 2 54 86 40 59

info@romer.fr, www.romer.com

### GERMANY

Wetzlar

Tel: +49 6441 207-0, Fax: +49 6441 207-122

contact.de@hexagonmetrology.com, www.hexagonmetrology.de

Munich

Tel: +49 89 14 98 10 14, Fax: +49 89 14 98 10 59

### ITALY

Turin

Tel: +39 011 4025 111, Fax: +39 011 4025 472

commerciale.it@hexagonmetrology.com, www.hexagonmetrology.it

Milan

Tel: +39 02 6154 111, Fax: +39 02 6150 473

Bologna

Tel: +39 051 725 254, Fax: +39 051 725 288

Frosinone

Tel: +39 335 7484 562, Fax: +39 0775 270 758

Verona

Tel: +39 335 7622 338, Fax: +39 011 4025 472

## POLAND

Warsaw  
Tel: +48 22 500 28 62, Fax: +48 22 500 28 64  
info.pl@hexagonmetrology.com, www.hexagonmetrology.pl

Krakow  
Tel: +48 12 647 08 27, Fax: +48 12 647 08 27

## SPAIN

Barcelona  
Tel: +34 93 594 69 20, Fax: +34 93 594 69 21

Madrid  
Tel: +34 93 594 69 20, Fax: +34 93 594 69 21

Vitoria-Gasteiz  
Tel: +34 93 594 69 20, Fax: +34 93 594 69 21  
recepcion.spain@hexagonmetrology.com, www.hexagon.es

## SWEDEN

Eskilstuna  
Tel: +46 16 16 08 00, Fax: +46 16 16 08 90  
info.se@hexagonmetrology.com, www.hexagonmetrology.se

Göteborg  
Tel: +46 31 51 40 10, Fax: +46 16 16 08 99  
hmc-gbg.se@hexagonmetrology.com

Trollhättan  
Tel: +46 520 151 61, Fax: +46 16 16 08 99  
hmc-thn.se@hexagonmetrology.com

## SWITZERLAND

Crissier  
Tel: +41 21 633 50 33, Fax: +41 21 633 50 34  
mail.ch@hexagonmetrology.com, www.hexagonmetrology.ch

Aarau-West  
Tel: +41 62 737 67 37, Fax: +41 62 737 67 38

Renens (TESA)  
Tel: +41 21 633 16 00, Fax: +41 21 635 75 35  
tesa-info@hexagonmetrology.com, www.tesabs.ch

Unterentfelden (Leica Geosystems, Metrology Products)  
Tel: +41 62 737 67 67, Fax: +41 62 737 68 68  
info.metrology@leica-geosystems.com  
www.leica-geosystems.com/metrology

## TURKEY

Ankara  
Tel: +90 312 417 14 14, Fax: +90 312 425 58 38

Bursa  
Tel: +90 224 441 98 00, Fax: +90 224 441 06 05  
info.turkey@hexagonmetrology.com, www.hexagonmetrology.com.tr

## UK

Telford  
Tel: +44 870 446 2667, Fax: +44 870 446 2668  
enquiry.uk@hexagonmetrology.com, www.hexagonmetrology.co.uk

## Asia-Pacific

---

### CHINA

#### Beijing

Tel: +86 10 6789 2461, Fax: +86 10 6789 2462  
info@chinabnsmc.com, www.hexagonmetrology.com.cn

#### Chengdu

Tel: +86 28 8671 6718, Fax: +86 28 8671 6730

#### Guangzhou

Tel: +86 20 3810 7978, Fax: +86 20 3810 7979

#### Nanjing

Tel: +86 25 8698 8800, Fax: +86 25 8698 8801

#### Ningbo

Tel: +86 574 8737 6262, Fax: +86 574 8733 5159

#### Qingdao

Tel: +86 532 8870 5188, Fax: +86 532 8870 2830

#### Shanghai

Tel: +86 21 6353 1000, Fax: +86 21 5106 2273

#### Shenyang

Tel: +86 24 2334 1690, Fax: +86 24 2334 1685

#### Shenzhen

Tel: +86 755 8602 8088, Fax: +86 755 8602 7270

#### Suzhou

Tel: +86 512 6280 0880, Fax: +86 512 6280 0990

#### Wuhan

Tel: +86 27 8792 8428, Fax: +86 27 8719 6191

#### Xi'an

Tel: +86 29 8836 1018, Fax: +86 29 8836 1019

### INDIA

#### Noida

Tel: +91 120 433 4466, Fax: +91 120 433 2455  
contact@hexmetindia.com, www.hexagonmetrology.asia

#### Bangalore

Tel: +91 80 4113 0539, Fax: +91 80 4113 0489

#### Pune

Tel: +91 20 2729 0114, Fax: +91 20 2729 0116

#### Chennai

Tel: +91 44 2635 0055, Fax: +91 44 2635 0056

### JAPAN

#### Sagamihara-shi, Kanagawa

Tel: +81 42 700 3500, Fax: +81 42 700 3511  
info.jp@hexagonmetrology.com, www.hexagonmetrology.asia

### KOREA

#### Seongnam, Gyeonggi-do

Tel: +82 31 777 3477, Fax: +82 31 777 3478  
korea@hexagonmetrology.com, www.hexagonmetrology.asia

#### Ulsan, Gyeong-nam

Tel: +82 52 227 3480, Fax: +82 52 227 3481

## MALAYSIA

Petaling Jaya, Selangor  
Tel: +60 3 5632 8900, Fax: +60 3 5632 8955  
contact.my@hexagonmetrology.com, www.hexagonmetrology.asia

## SINGAPORE

Tel: +65 6463 6242, Fax: +65 6463 8030  
contact@hexagon-metrology.com.sg, www.hexagonmetrology.asia

## TAIWAN

Taipeh  
Tel: +886 2 2600 6360, Fax: +886 2 2600 6362  
info@chinabnsmc.com, www.hexagonmetrology.com.cn

## THAILAND

Bangkok  
Tel: +66 2 361 3695, Fax: +66 2 746 9607  
hexagon.thailand@hexagonmetrology.com, www.hexagonmetrology.asia

## VIETNAM

Hanoi  
Tel: +84 4 3936 7935, Fax: +84 4 3936 8069  
contact@hexagon-metrology.com.sg, www.hexagonmetrology.asia

## North America

---

info@hexagonmetrology.us, www.hexagonmetrology.us

## USA

Rhode Island, North Kingstown  
Tel: +1 800 343 7933 (Toll Free), Tel: +1 401 886 2000, Fax: +1 401 886 2727

California, Lake Forest  
Tel: +1 800 955 5200, Fax: +1 949 727 0167

Illinois, Elgin  
Tel: +1 847 931 0100, Fax: +1 847 931 1979

Michigan, Wixom  
Tel: +1 248 449 9400, Fax: +1 248 449 7438

North Carolina, Huntersville  
Tel: +1 704 947 1250, Fax: +1 704 947 1277

Ohio, Miamisburg  
Tel: +1 800 329 4204 (Toll Free), Tel: +1 937 247 0425, Fax: +1 937 247 0426

Tennessee, Nashville  
Tel: +1 615 331 0800, Fax: +1 615 331 0875

Texas, Irving  
Tel: +1 972 506 8359, Fax: +1 972 506 9162

Washington, Kent  
Tel: +1 253 872 2443, Fax: +1 253 872 2579

Wisconsin, Fond du Lac  
Tel: +1 920 906 7700, Fax: +1 920 906 7701

## MEXICO

Apodaca, Nuevo León  
Tel: +52 81 1367 0800, Fax: +52 81 1367 0801  
info@hexagonmetrology.com.mx, www.hexagonmetrology.com.mx

## South America

---

### BRAZIL

São Paulo

Tel: +55 11 5525 6000, Fax: +55 11 5687 2101

vendas.br@hexagonmetrology.com, [www.hexagonmetrology.com.br](http://www.hexagonmetrology.com.br)

Santa Barbara d'Oeste

Tel: +55 19 3455 4516

vendas.br@hexagonmetrology.com

Paraná - Curitiba

Tel/Fax: +55 41 3015 5661

vendas.br@hexagonmetrology.com

Minas Gerais - Belo Horizonte

Tel/Fax: +55 31 3234 0067

vendas.br@hexagonmetrology.com

### ARGENTINA

Pilar

Tel: +54 2322 300 060

Buenos Aires

Fax: +54 2322 300 059

ventas.ar@hexagonmetrology.com, [www.hexagonmetrology.com.ar](http://www.hexagonmetrology.com.ar)

## Africa, Central & Eastern Europe, Middle East

---

Tel: +39 011 4025 111, Fax: +39 011 7803 254

info.itex@hexagonmetrology.com, [www.hexagonmetrology.eu](http://www.hexagonmetrology.eu)

## Algeria, Morocco, Tunisia

---

Tel: +33 1 69 29 12 00, Fax: +33 1 69 29 00 32

commercial.fr@hexagonmetrology.com, [www.hexagonmetrology.fr](http://www.hexagonmetrology.fr)

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