10’000 SINGLE PARTS.
1 METROLOGY PARTNER.

HEXAGON
METROLOGY

Intro

Hexagon Metrology is a world leading supplier of precision industrial metrology products, ranging from manual gages to coordinate measuring machines and robots, from advanced metrology software to integrated systems for quality assurance.

Hexagon Metrology represents the largest concentration of internationally recognized brands in the dimensional metrology market in terms of product line width, superior technological level, and extended market presence.

Hexagon Metrology's complete range of Portable CMM solutions includes articulated arms, laser trackers, wireless probes, hand-held contactless scanners and white light scanners.

The CMM product line, the most comprehensive currently on the market from a single supplier, ranges from small manual bridge machines to very large systems for the aerospace industry, to ultra-high precision, sub-micron CMMs. In addition to conventional and Portable CMMs, Hexagon Metrology product line includes but is not limited to sensors (contact and non-contact), software, after-market service and support.

Norbert Hanke
CEO & President Hexagon Metrology

Contents

PORTABLE MEASURING ARMS

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 CMS108 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.

CMS108 laser scanner
for ROMER Absolute Arm

With CMS108, 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 CMS108 automatically adapts to the surface conditions. CMS108 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 CMS108 high performance scanner
- Elaborated system design – no external cable around the arm
- TESA connector for CMS108 – easily changeable, only one calibration
- Open platform for future integrations thanks to TESA connector and Feature Pack technology

ROMER Tube Inspection System

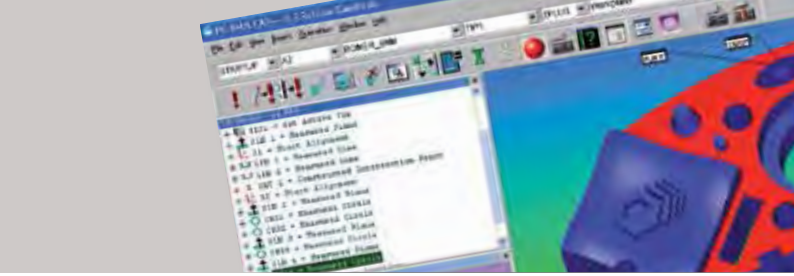
The quick non-contact measurement solution for the inspection of benttubes in your work shop. **ROMER Arm Tube** is the ideal solution especially designed for tube shop and mainly in automotive, aerospace, furniture, air conditioning and subcontracting industries.

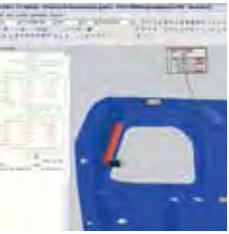
The latest technology in non-contact measurement:

- 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.





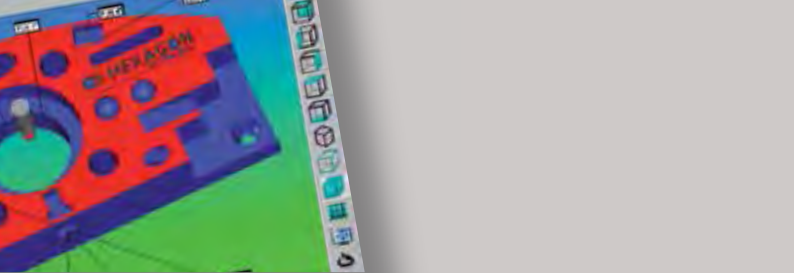
PC-DMIS 3D inspection and measurement

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.

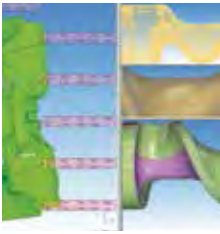
PC-DMIS Portable offers a range of innovative features:

- 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.

PowerINSPECT for geometric features and surfaces

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.

PolyWorks for point cloud inspection and reverse engineering

PORTABLE CMM

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.

A **Leica 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, 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 form 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.

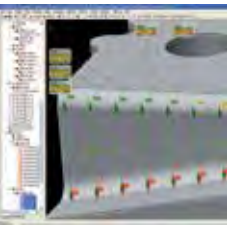
The **Leica TM6100A** is the world's most accurate theodolite with the highest angular accuracy, panfocal telescope and autocollimation device. With unrivalled precision and superb optics, the Leica TM6100A has become the standard instrument of choice in the aerospace industry for satellite alignment 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 combined with the powerful functionality supports your most demanding measurement tasks. While you do your measurement job, PC-DMIS Portable is automatically creating a program for repetitive tasks.

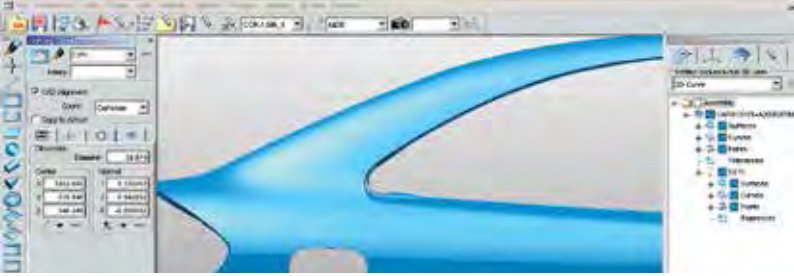
emScon – Laser Tracker programming interface

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.



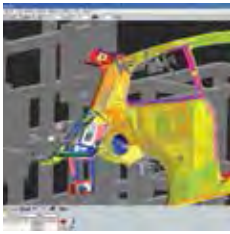
PolyWorks Industriel measurement software

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



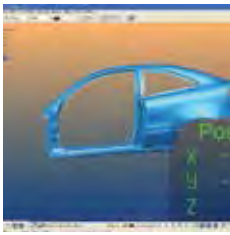
deformations and to fix problems in the earlier stage of the manufacturing process or approve your manufacturing process by fully inspecting your first-assembled products.

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.

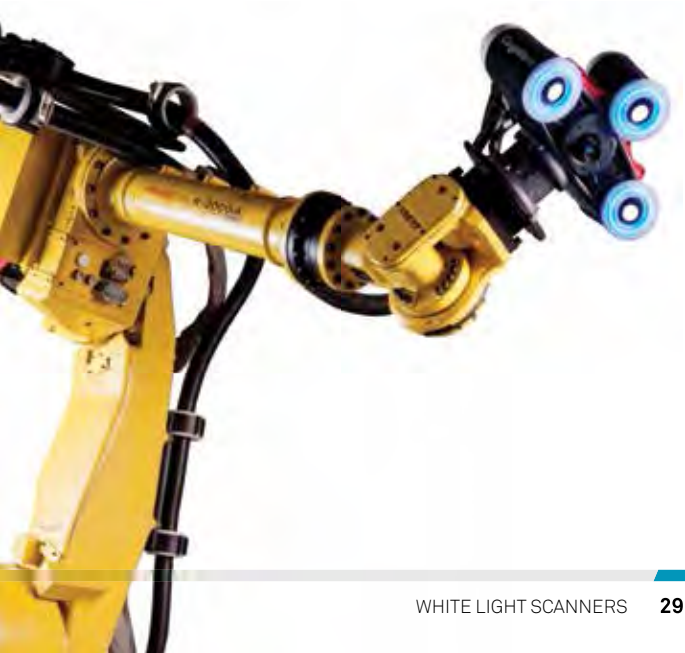


WHITE LIGHT SCANNERS

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:

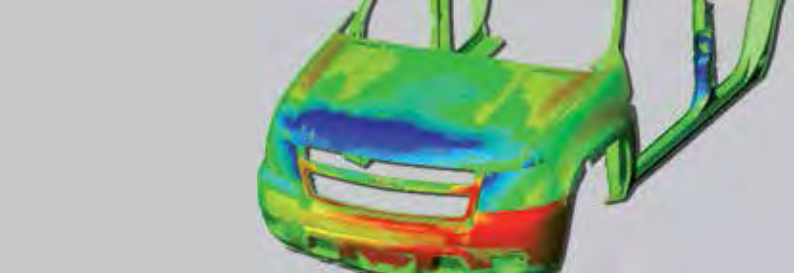
CoreView Plan
Dedicated software tool used for accelerating tasks of planning, defining and preparing comprehensive dimensional measurement programs for Cognitens systems.

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.

3D Model

BRIDGE CMMS

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 DEA 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.

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

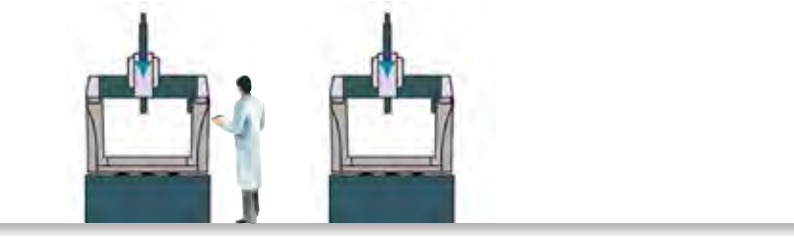
ISO 10360 Performance Specs (µm)
MPE_E = from 3.0 + 4.0 L/1000

DCC Model

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

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

ISO 10360 Performance Specs (µm)
$MPE_E = 2.5 + 3.9\ L/1000$

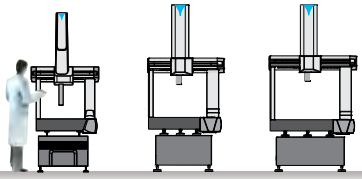


Model 07.07.05 Model 07.10.07

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.

Measuring Range (mm)
from 700 x 700 x 500 to 700 x 1000 x 650

ISO 10360 Performance Specs (µm)
MPE_E = from 3.9 + 4.0 L/1000
$MPE_{THP/T}$ = from 6.5 µm/85 s



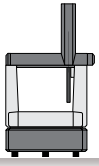
Model 05.06.04 Series 06.xx.06 Series 08.xx.06

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.

Measuring Range (mm)
from 500 x 600 x 400 to 800 x 1200 x 600

ISO 10360 Performance Specs (µm)
MPE_E = 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.

Measuring Range (mm)
from 508 x 609 x 406 to 762 x 1016 x 609

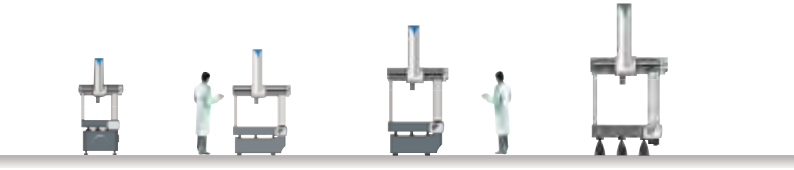
ISO 10360 Performance Specs (µm)
MPE_E = 3.9 + 4.0 L/1000
$MPE_{THP/T}$ = 6.5 µm/85 s

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 (µm)
MPE_E = 1.0 + 2.5 L/1000
$MPE_{THP/T}$ = 2.0 µm/68 s

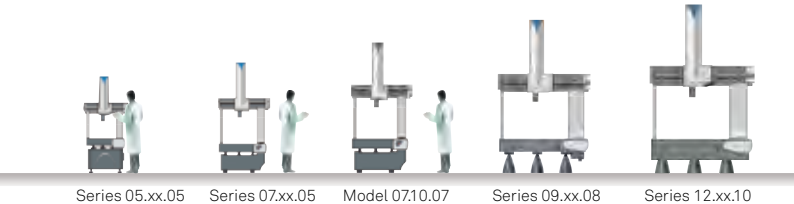


Series 05.xx.05 Series 07.xx.05 Model 07.10.07 Series 09.xx.08

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.

Measuring Range (mm)
from 500 x 500 x 500 to 900 x 2000 x 800

ISO 10360 Performance Specs (µm)
MPE_E = from 1.9 + 3.3 L/1000
$MPE_{THP/T}$ = from 3.5 µm/68 s



Series 05.xx.05 | Series 07.xx.05 | Model 07.10.07 | Series 09.xx.08 | Series 12.xx.10

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).

Measuring Range (mm)
from 500 x 500 x 500 to 1200 x 3000 x 1000

ISO 10360 Performance Specs (µm)
MPE_E = from 1.5 + 3.0 L/1000
$MPE_{THP/T}$ = from 2.9 µm/45 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 = from 1.4 + 3.0 L/1000
$MPE_{THP/T}$ = from 2.5 µm/45 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

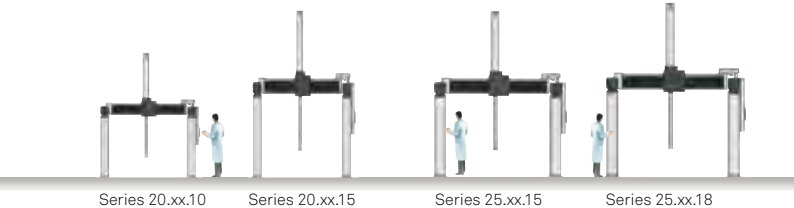
ISO 10360 Performance Specs (µm)
MPE_E = from 1.4 + 3.0 L/1000
$MPE_{THP/T}$ = from 2.5 µm /45 s

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.

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

ISO 10360 Performance Specs (µm)
MPE_E = from 12 + 18 L/1000

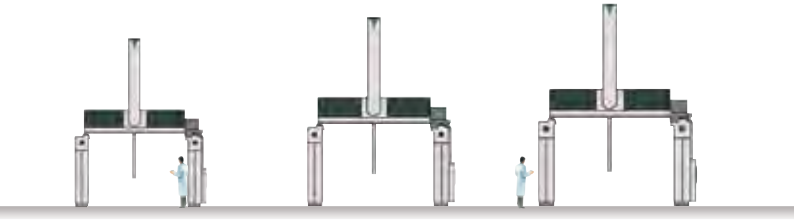


Series 20.xx.10 Series 20.xx.15 Series 25.xx.15 Series 25.xx.18

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.

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

ISO 10360 Performance Specs (µm)
MPE_E = from 3.5 + 3.5 L/1000
$MPE_{THP/T}$ = from 5 µm/100 s



Series 20.xx.15
20.xx.20

Series 25.xx.15
25.xx.20

Series 30.xx.20
30.xx.25

GANTRY CMMS

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.

Measuring Range (mm)
from 2000 x 3300 x 1500 to 3000 x 8000 x 2500

ISO 10360 Performance Specs (µm)
MPE_E = from 4.0 + 3.8 L/1000
$MPE_{THP/T}$ = from 4.5 µm/100 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 = from 5.5 + 6.0 L/1000
$MPE_{THP/T}$ = from 6.0 µm/120 s

Series xx.16.21
Series xx.16.25

HORIZONTAL ARM CMMS

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.

Measuring Range (mm)
from 4000 x 1600 x 2100 (single arm)
to 7000 x 3218 x 2500 (dual arm)

ISO 10360 Performance Specs (µm)
MPE_E = from 30 + 25 L/1000

Series T

Series R

Series C

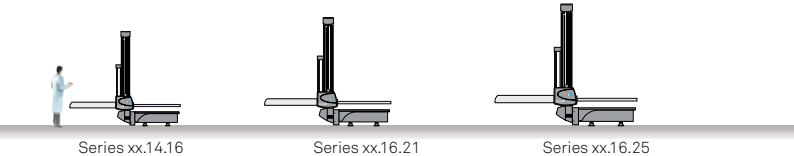
Designed to provide maximum flexibility and suitability to a variety of applications, **DEA MERCURY** is available in both manual and automatic versions, as well as in single, double and even multiple-arm configurations. The combination of performance and affordability makes DEA MERCURY the ideal solution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

Measuring Range (mm)
from 2000 x 1200 x 1200 to 12000 x 2000 x 3000 (single arm)
from 2000 x 2400 x 1200 to 12000 x 4000 x 3000 (dual arm)

ISO 10360 Performance Specs (µm)
MPE_E = from 15 + 20 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).

Measuring Range (mm)
from 3000 x 1400 x 1600 (single arm)
to 6000 x 1600 x 2500

ISO 10360 Performance Specs (µm)
MPE_E = from 15 + 10 L/1000

Series xx.16.21 Series xx.16.25 Series xx.16.30

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.

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

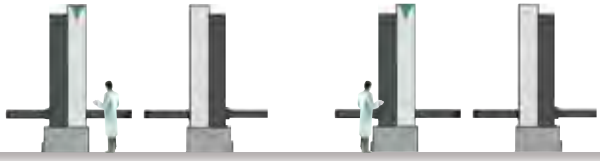
ISO 10360 Performance Specs (µm)
MPE_E = from 20 + 13 L/1000

Series xx.16.21 Series xx.16.25 Series xx.16.30

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.

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

ISO 10360 Performance Specs (µm)
MPE_E = from 15 + 10 L/1000



Series xx.14.20
Series xx.16.20

Series xx.14.24
Series xx.16.24

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.

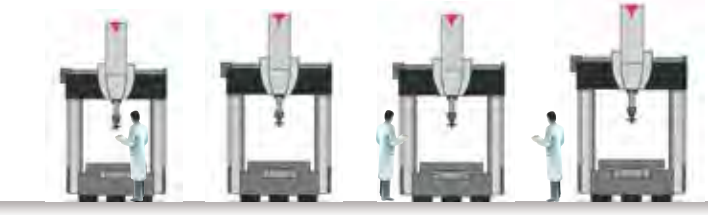
Measuring Range (mm)
from 6000 x 1400 x 2000 (single arm)
to 7000 x 3150 x 2400 (double arm)

ISO 10360 Performance Specs (µm)
MPE_E = 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.



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

ULTRA HIGH ACCURACY CMMS

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 accomodate 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

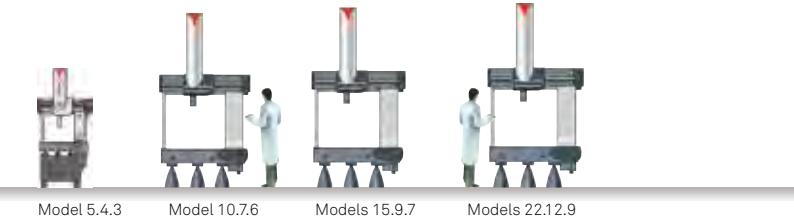
ISO 10360 Performance Specs (µm)
MPE_E = from 0.4 + L/1000
MPE_P = from 0.5
MPE_{THP} = from 1.4 µm/68 s

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 µm with a reproducibility better than 0.1 µm.
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.

Measuring Range (mm)
1200 x 1000 x 700

ISO 10360 Performance Specs (µm)
$MPE_E = 0.3 + L/1000$
$MPE_P = 0.4$
$MPE_{THP} = 1.2$ µm/59 s

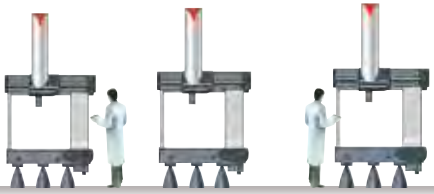


Model 5.4.3 | Model 10.7.6 | Models 15.9.7, 20.9.7 | Models 22.12.9, 30.12.9, 45.12.9

The **Leitz Reference HP** (**H**igh **P**recision) 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 accomodate 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 = from 0.8 + L/400
MPE_P = from 0.8
MPE_{THP} = from 1.6 µm/45 s

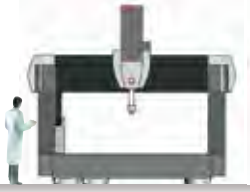


Model 10.7.6 | Models 15.9.7 20.9.7 | Model 22.12.9

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 "fle**Xi**ble". The Leitz Reference XT additionally offers outstanding temperature stability: Within the e**XT**ended temperature range from 15 to 30 degree Celsius the Leitz Reference XT measures reliably thanks to a sophisticated temperature compensation system.

Measuring Range (mm)
from 1000 x 700 x 600 to 2200 x 1200 x 900

ISO 10360 Performance Specs (µm)
MPE_E = from 1.2 + L/350
MPE_P = from 1.2
MPE_{THP} = from 2.2 µm/45 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^3. 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.

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_E	from 1.7 + L/400	from 1.7 + L/300
MPE_P	from 1.5	from 1.5
MPE_{THP}	from 2.2 µm/52 s	from 2.2 µm/52 s

Models xx.20.12
xx.30.12
xx.40.12
xx.45.12
xx.20.16
xx.30.16
xx.40.16
xx.45.16
xx.20.20
xx.30.20
xx.40.20
xx.45.20
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/58 s

*) other sizes available upon request

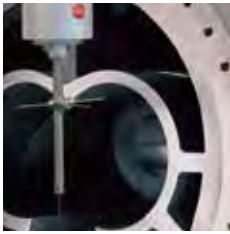
Model 6.8.9

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.

Measuring Range (mm)
600 x 800 x 900

ISO 10360 Performance Specs (µm)
MPE_E = from 1.3 + L/400
MPE_P = from 1.3
MPE_{THP} = from 1.9 µm/24 s

SCANNING PROBES

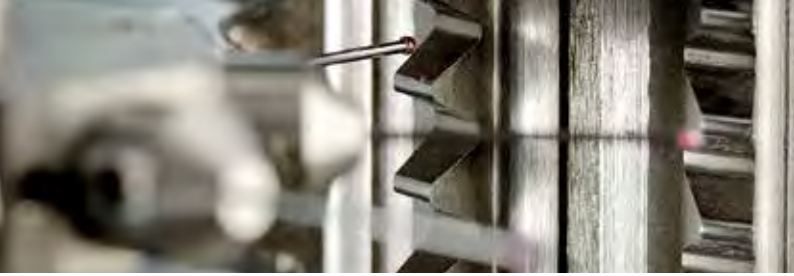


LSP-X5 – Ultra-precise, full 3D, fixed scanning probe head capable of simultaneously measuring in the X, Y, and Z directions to precisely define the orientation of the workpiece surface. This heavy-duty analog probe features very high and repeatable accuracy even with extra-long probe extensions and 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.

OPTICAL AND MULTI-SENSOR MEASURING SYSTEMS

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 fixed bridge 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.

Measuring Range (mm)
from 300 x 200 x 150 to 400 x 500 x 300

ISO 10360-7 Vision Performance Specs (µm)
Exy = from 2.0 + 5L/1000

ISO 10360-2 Tactile Performance Specs (µm)
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 fixed bridge 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 (µm)
Exy = from 1.5 + L/150

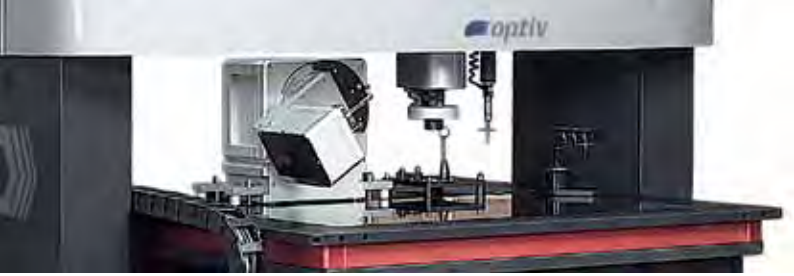
ISO 10360-2 Tactile Performance Specs (µm)
E_3 = from 2.9 + L/100

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.

Measuring Range (mm)
from 450 x 400 x 300 to 1050 x 1000 x 600

ISO 10360-7 Vision Performance Specs (µm)
Exy = from 1.1 + L/500

ISO 10360-2 Tactile Performance Specs (µm)
E_3 = 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.

Measuring Range (mm)
from 530 x 400 x 300 to 730 x 600 x 300

ISO 10360-7 Vision Performance Specs (µm)
Exy = from 0.8 + L/400

ISO 10360-2 Tactile Performance Specs (µm)
E_3 = 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 is the basis for high accuracy and high travel speeds.

Measuring Range (mm)
from 410 x 410 x 200 to 650 x 600 x 300

ISO 10360-7 Vision Performance Specs (µm)
Exy = 1.3 + L/400

ISO 10360-2 Tactile Performance Specs (µm)
MPE_E = 1.9 + L/300
MPE_P = 1.5 µm

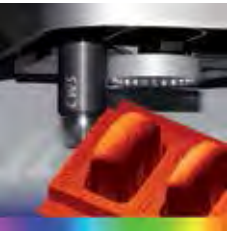
ISO 10360-4 Scanning Performance Specs (µm)
MPE_{THP} = 2.0 µm/90 s

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 microstructures
- For the digitization of glossy surfaces (e.g. glass, polished metal)
- For the digitization of transparent materials

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.

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° 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
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 3 024 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 that 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-mp 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° allows the probe head to rotate through to 180° as well as angles ranging from +90° to -115° to be reached. The total number of positions is as high as 3 024. A new version is available with increments of 7.5° allowing to reach angles ranging from -180° to +180° on the B-axis and 0° to +105° 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

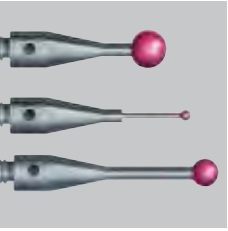
This probe consists of two main parts, i.e. the mounting module and the probe itself. Both parts are put together by means of a magnetic coupling system ensuring a repositioning repeatable to 0.1 µm while allowing manual or automatic probe changing with no need for recurrent qualification. The four models 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 2, 4 or 6 modules. Extra modules that are also compatible with TESASTAR-r 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. Poduced at Renens under the SWISS MADE label, each product gives evidence of a consistent family to customers.

TESA CAL IP67 Magna m 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.

In an effort to continuously improve their state of the art height gauges, TESA recently added a new driving motor to their **MICRO-HITE Plus M** models, ensuring enhanced accuracy.
A strictly controlled measuring force guarantees unmatched repeatability.

Making automatic function more user-friendly!
The **TESA MH3D Recorder** is unique in its genre and is characterised by its simple to manage automatic function, which makes it accessible to everyone, from the workshop to the laboratory.

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.

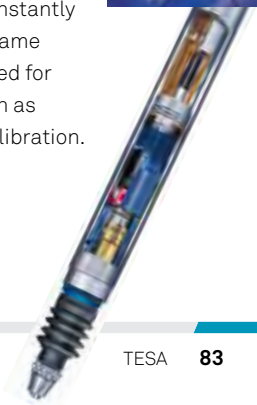
A new range of **wireless probes** is moreover available. Featuring a unique TESA-proprietary communication protocol, these wireless probes offer unsurpassed robustness and stability during data transfer.

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.



Vision measuring made easy!
Machines characterised by a granite structure for increased sturdiness, the **TESA-VISIO** are also equipped with better optical and mechanical components for quality results over time.

The modules TESA-REFLEX Vista and TESA-Reflex Vision are intuitive to operate and meet all your requirements. The optional module « Compar « is available with **TESA-Reflex Vista** and enables visual comparison of your components and their CAD models.

MEASURING ON MACHINE TOOLS

- HDR (High Data Rate) transmission excludes interference of measuring from ambient light
- Large transmitting and receiving angles guarantee reliable transmission and enable a large working area

Infrared Touch Probe IRP25.41
Modular probe used on vertical and horizontal machining centers. Chameleon function providing compatibility with nearly all other IR probe systems on the market.

Infrared Touch Probe IRP40.01 with THERMO-LOCK® technology
Compact probe with bi-directional transmission used on HSC machines with small shanks and small tool changers as well as on lathes. Shanks equipped with THERMO-LOCK® technology prevent heat transfer from the spindle to the probe.

Infrared Tool Setter IRT35.70
Tool measurement system for milling machines and machining centers. Mounting directly on the machine table at different locations is made possible by magnetic clamping. It has a very high level of repeatability when placing it in the machine, also with twin table machining (patented).

Radio-wave Probing Systems

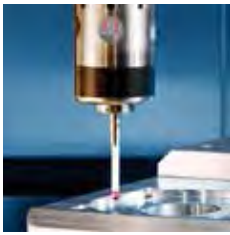
- Protected frequency range, proven worldwide
- Safe signal transmission redundant transmission protocol
- 64 channels freely adjustable
- High transmitting power

Radio-wave Touch Probe RWP20.41

Modular probe for the use on large sized machine tools. Adjustable trigger force supports complex measurement tasks, including measurements deep inside of workpieces.

Radio-wave Touch Probe RWP38.41

Compact, modular probe with adjustable trigger force used on machine tools with limited tool diameters and limited Z-Axis height. Ideal for complex measurement tasks.

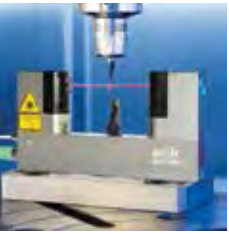


Radio-wave Tool Setter RWT35.50

Freely positionable tool measurement system with radio transmission for vertical lathes, large mills, and machining centers.
Held in place with magnetic force, it can be placed anywhere in the machining area without tools. Wireless operation and minimum footprint ensure maximum use of the machining area.

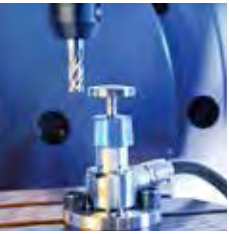
Tool Setters

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.



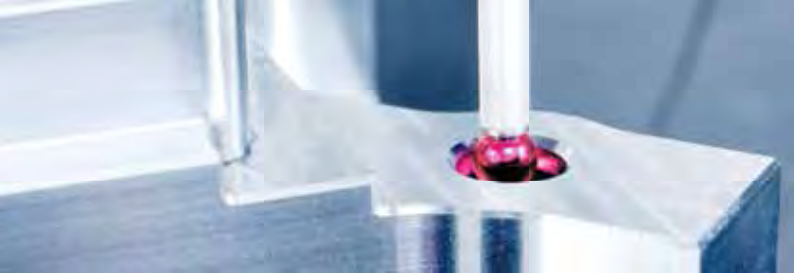
Laser Tool Setter LTS35.65

Cost-efficient standard laser tool setter for everyday measuring tasks on the machine tool for tools from Ø 0.030 mm. Integrated m&h cleaning nozzles and air curtain during measuring prevent pollution. Simple measuring cycles ensure high functional reliability and easy handling.

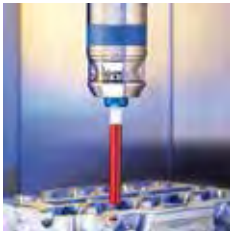


Tool Setter TS35.10

Variable-height tool setter with adjustable probing force used to determine tool geometry in milling machines and machining centers. Both dynamic as well as static measurements are possible.



Temperature Probes
Probes with infrared or radio transmission for automatic workpiece temperature measurement (patented). Temperature measurement can be used to control manufacturing processes and to adjust machining parameters during production.



Production Probe PP41.00
A very compact probe which is completely compatible with existing systems on the market, used on tool grinders, cylindrical grinders, rotary transfer machines, and for special measurement tasks.

Measuring Software

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.

3D Form Inspect

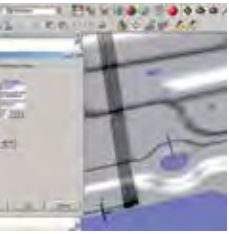
Measuring and quality control on the machine tool is gaining increasing importance in progressive manufacturing plants. This software enables quick, easy measuring and logging of important geometries and shapes on all sides and with all axes directly on the machine tool. This saves time, provides safety, and enhances quality.

PC-DMIS NC Gage

Developed for easy, quick and safe application of touch probes without requiring the operator to have programming skills or special knowledge of measuring technology. The unique "teach-in method" in manual operation enables a dialogue-based procedure. This process will immediately deliver the desired result. Setup operation of the machine, manual measuring cycles as well as automatic measuring and logging – it is a child's play.

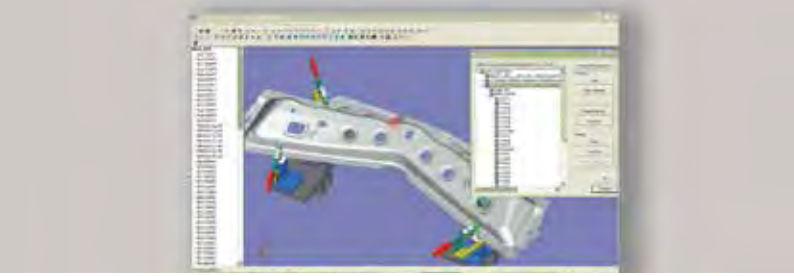
SOFTWARE FOR CMMS

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.

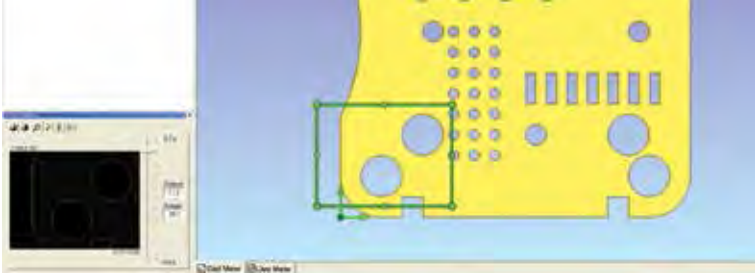


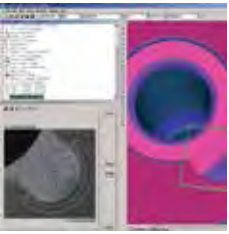
PC-DMIS CAD lets users:

- 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.



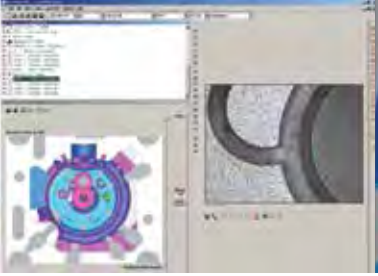


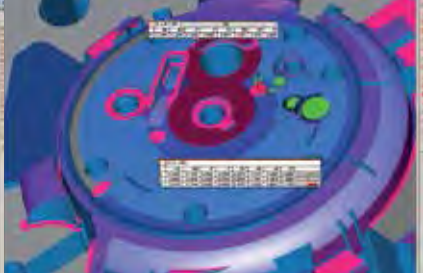
PC-DMIS® Vision sets a new standard for Vision Metrology Software. It is the industry's first CAD-based software package, and it is both powerful and easy to use.

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



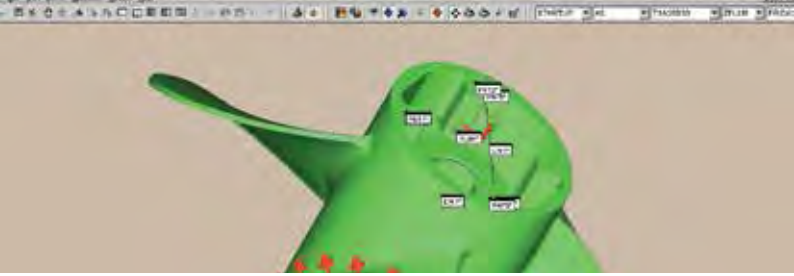


gives full control over which parts of a feature the software includes in its evaluation.

- 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 inpection requirements into their models. The second, IP Measure is PC-DMIS based. It reads the inspection plan and converts design intent into measurement programs.

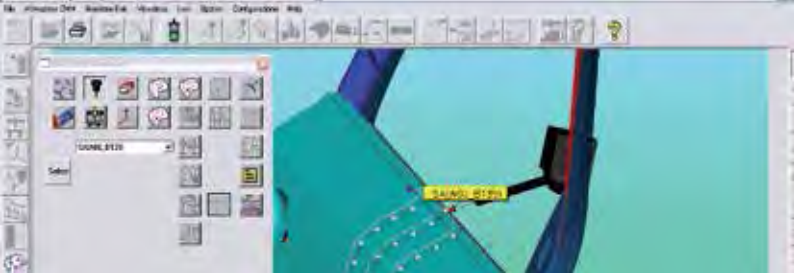


IP Planner lets designers:

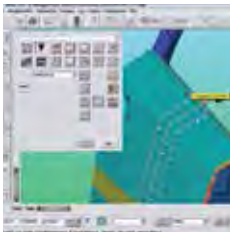
- Use a CAD model to create a virtual, marked-up blueprint.
- Define the part's datums, dimensions and tolerances off the CAD system's built-in GD&T. This software is an add-in, sharing the look and feel of the host software.
- Electronically close the loop between design, manufacturing and metrology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

IP Measure lets metrology programmers:

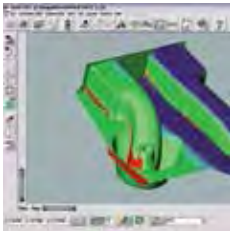
- Automatically turn inspection plans into measurement programs decreasing part programming time by up to 70%.
- Stop manually typing in measurement parameters and minimize data input errors.
- Optimize probe paths for new and existing part programs and detect collisions with both parts and fixtures.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



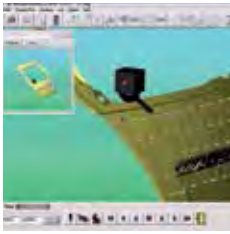
Surfer EVO is a powerful and flexible solution offering a larger number of modules to suit a broad range of inspection, quality control, dimensional analysis, reverse engineering and scanning data processing applications.

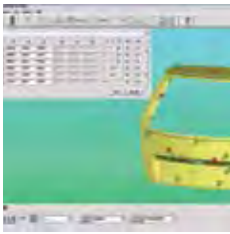


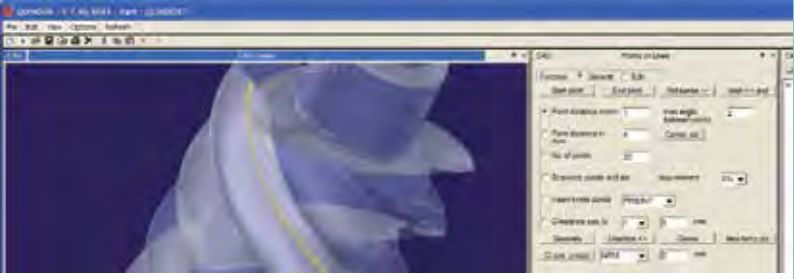
Surfer EVO offers dedicated tools for off-line analysis and report generation, including creation of part-to-CAD alignments and optimization of measured data, as well as advanced modules for GD&T analysis of free-form models (profile tolerances on surfaces and curves) and prismatic models (location,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

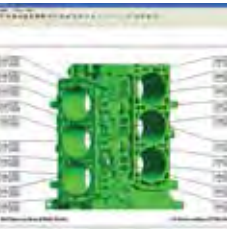


Surfer EVO includes specific solutions for profile and thickness analysis, including measuring, programming, evaluation and reporting. A wide range of CAD interfaces for fast import of large parts and assemblies is provided as well as several interfaces with the most common measuring machines. Surfer 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 offers a comprehensive range of products and services for all industrial metrology applications in sectors such as automotive, aerospace, energy and medical. We support our customers with actionable measurement information along the complete life cycle of a product – from development and design to production, assembly and final inspection.

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

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

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.

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